Rosemont Copper Company

AERMOD Modeling Report to Assess Ambient Air Quality Impacts

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1. INTRODUCTION

The proposed Rosemont Copper Company Project (Rosemont) is a new open pit copper mine that will be located in the Santa Rita Mountains approximately 30 miles southeast of Tucson, Arizona in Pima County (Figure 1.1). Rosemont submitted an application titled " *Application for a Class II Permit Rosemont Copper Project Southeastern Arizona*", to the Arizona Department of Environmental Quality (ADEQ) on November 15, 2011. An amendment to this application was submitted on March 19, 2012. This air impact analysis of emissions from the proposed facility is being submitted to support the application. The objective of the modeling analysis is to demonstrate protection of the National Ambient Air Quality Standards (NAAQS).

The air impact analysis presented herein is based on the modeling protocol titled "*Rosemont Copper Company AERMOD Modeling Protocol to Asses Ambient Air Quality Impacts*" which was submitted to ADEQ on Dec 2, 2011. This protocol was developed following applicable portions of the ADEQ guidance document: *Air Dispersion Modeling Guidelines for Air Quality Permits*, December 2004 (ADEQ Guidance) and the EPA *Guideline on Air Quality Models* (*Guidelines*, 40 CFR Part 51, Appendix W, November 2005). Changes requested on May 18, 2012 by ADEQ to the protocol have been incorporated into the modeling presented in this report. The remaining sections of this report present the air dispersion modeling methodology and modeling results for the proposed Rosemont facility.

1.1 Facility Description

The Rosemont project includes an open-pit mine and ore processing operations comprised of milling, copper concentrating, copper leaching, and solvent extraction/electrowinning. No copper smelting is included in the project, nor is any connection to any existing copper smelter under consideration. The production schedule developed from mining sequence plans indicates a project operating life of approximately 20-25 years using only proven and probable mineral reserves.

Peak mining rates of approximately 115,000,000 tons per year (tpy) of total material (ore and waste) could be anticipated in Year 1. During this year of operation, however, operations would still be in the development stages. Once full-scale operation has been achieved, maximum mining rates during Years 2-10 are estimated by including a 20% capacity factor above the average mining capacity. For Years 2-10 the maximum mining rate is expected to be approximately 110,000,000 tpy of total material. Mining rates are expected to taper off during the remaining years of the project.

Mining of the ore will be through conventional open-pit mining techniques including drilling, blasting, loading, hauling and unloading. Waste rock will be transported by haul truck to the waste rock storage areas. Ore will be either transported by haul truck to the leach pad (oxide ore), or crushed and loaded onto a conveyor for transport to the mill (sulfide ore). The copper and molybdenum concentrates from the milling and flotation operations will be shipped off-site for further processing. Oxide ore will be placed on the lined leach pad. Pregnant leach solution (PLS) from the pad will be collected in a solution pond and then processed through the SX/EW plant. Copper cathodes generated from the SX/EW plant will be transported off-site for further processing.

1.2 Site Description

Rosemont will be located in Pima County, approximately 30 miles southeast of Tucson, Arizona (Arizona Geological Society 2007:11) as shown in . Regionally, the facility location is in the eastern part of the Sonoran Desert sub-province of the Basin and Range physiographic province (Arizona Geological Society 2007:26), near the boundary with the Mexican Highlands. The area is characterized by northerly trending fault block mountains separated by broad, down-faulted valleys (see Figures 1.1, 3.1 and 5.1) on the eastern slope of the Santa Rita Mountains, a range that separates the Cienega Basin to the east from the Santa Cruz Basin to the west. The site is at an elevation of approximately 5,350 feet with elevations in the project area range from 4,600 feet to nearly 6,300 feet above mean sea level. Slope angles vary from less than 3 percent in drainage bottoms to more than 100 percent on the rock faces of some mountain fronts.

Areas where mine activities take place, including the open pit, waste rock storage area, tailings area, heap leach facility, plant site and ancillary facilities, and mine primary and secondary access roads will be excluded from public access by fencing and signage. These areas will not be accessible to the public and the boundaries will be formally and legally established through the EIS process.

1.3 Operational Changes Planned Since Prior Submittals

As described in the permit application amendment titled "*Amendment to: Application for a Class II Permit and Emission Inventory Information Rosemont Copper Project Southeastern Arizona*", Rosemont has re-evaluated its proposed operations and will be making the following changes that affect particulate matter (PM) and gaseous emissions from the proposed facility:

- Six of the haul trucks will have Tier 4 engines rather than Tier 2 engines
- The entry road will be paved (a distance of 3.1 miles) as will access and main roads that are not traveled by haul trucks
- Changes to the lime systems, including slaking all lime in two lime slakers (controlled by a scrubber) prior to distribution to various processes
- Seven cartridge filter dust collectors will be installed in lieu of the six less-efficient wet scrubbers, and a cartridge filter dust collector will be installed for the molybdenum dust collector

The resulting change in the potential to emit (PTE) for PM less than 10 microns in diameter (PM_{10}) for fugitive, non-fugitive, and tailpipe emissions combined is a reduction of 52 tons per year (tpy) in Year 5. For PM less than 2.5 microns in diameter ($PM_{2.5}$), the combined reduction in fugitive, non-fugitive, and tailpipe emissions is 47 tpy. These numbers represent a 5% reduction of PM_{10} and a 25% reduction of $PM_{2.5}$ emissions for fugitive, non-fugitive, and tailpipe emissions combined (based on Year 5). Non-fugitive emissions of PM_{10} and $PM_{2.5}$ will be reduced by 42% and 81%, respectively in Year 5. Details of the changes in emissions for each category for different project years are provided in Appendix G. Facility-wide emissions of oxides of nitrogen (NO_x) will be reduced by 70 tpy

and volatile organic compound (VOC) emissions will be reduced by 6 tpy in Year 5 with the planned operational changes.

Figure 1.1 General location map of Rosemont and surrounding area.

2. AIR QUALITY REGULATORY FRAMEWORK

2.1 Rosemont Area Air Quality Classifications

EPA classifies air quality regions as "nonattainment" for a given pollutant if ambient air concentrations exceed the National Ambient Air Quality Standards (NAAQS). NAAQS are established separately for each of the "criteria" pollutants and these NAAQS have been promulgated under Title 40 of the Code of Federal Regulations (40 CFR) Part 50 (see http://www.epa.gov/air/criteria.html for more information). Areas that are not nonattainment are either "attainment" if the NAAQS have not been exceeded, or the area is deemed unclassifiable/attainment if insufficient data exists to make a determination. Attainment status is based on the results of ambient air quality monitoring, typically performed over a 3-year period.

The Rosemont area is classified as attainment or unclassifiable/attainment for particulate matter, represented as both PM_{10} and PM less than 2.5 microns nominal aerodynamic diameter ($PM_{2.5}$), as well as lead (Pb), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and ozone (O_3) (see 40 CFR §81.303 for the promulgated attainment status of all areas in Arizona, or http://www.epa.gov/oaqps001/greenbk/ for maps identifying nonattainment areas throughout Arizona and the United States). Each of the criteria pollutants may be directly emitted from a source, with the exception of ozone, which is produced by a complex photochemical reaction of volatile organic compounds (VOCs) and NO_X in the lower atmosphere.

2.2 Source Designation

New stationary sources located in attainment areas are subject to air quality permitting under Prevention of Significant Deterioration (PSD) as promulgated under 40 CFR Part 52 if the potential to emit of PM_{10}, $PM_{2.5}$, NO_x, SO_2, or CO exceed 250 tpy. Rosemont is not a PSD source. (While emissions of other pollutants also trigger PSD, the pollutants listed are of interest for the purposes of this modeling protocol.) PSD permitting involves a number of requirements, one of which is an air quality impact analysis involving dispersion modeling. Rosemont's emissions are well below the PSD thresholds for all pollutants, so PSD does not apply. However, since the PSD program does provide a long-standing, nationally-standardized framework for performing ambient air quality monitoring and dispersion modeling, the PSD methodologies will generally be applied for the modeling at Rosemont and have been applied for the ambient air quality monitoring. Since PSD does not apply to the Rosemont project, strict adherence to the PSD rules is not a regulatory requirement. It is important to note that while the PSD regulations provide a framework for ambient air quality monitoring and for dispersion modeling, PSD only applies to sources with a potential to emit that is much greater than those from the Rosemont project.

Based on the potential to emit (PTE) for all criteria pollutants, Rosemont will be categorized as a synthetic minor stationary source. Emissions of hazardous air pollutants (HAPs) will not exceed the major source thresholds of 10 tpy for a single HAP or 25 tpy for all HAPs combined, therefore Rosemont will also be a minor source of HAP emissions. Since the PTE for all criteria pollutants will be below 100 tpy and the facility will not be a major source of HAPs, Rosemont will not be subject to Title V permitting. Consequently, the facility will operate under a Class II Permit issued by the Arizona Department of Environmental Quality (ADEQ). Ambient air quality monitoring and air

dispersion modeling are not routinely required of Class II sources. Since the PSD status of the project was not yet determined early in the project's planning stages, ambient air quality monitoring was initiated as if PSD would apply. To support the application process, and at the request of the Forest Service to identify the potential impacts of emissions from Rosemont on air quality, this dispersion modeling analysis was performed.

2.3 Area Classification

The Rosemont Project area is classified as "attainment" (better than national standards) or un-classifiable/attainment for particulate matter less than 10 microns nominal aerodynamic diameter (PM_{10}), particulate matter less than 2.5 microns nominal aerodynamic diameter ($PM_{2.5}$), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and ozone (O_3) (see 40 CFR Part 81.303).

2.4 Baseline Area

The Rosemont Project will be located within the Pima Intrastate Air Quality Control Region (AQCR) which encompasses Pima County. This AQCR represents the "baseline area" for PSD purposes. The Rosemont Project, however, will not be subject to PSD regulations.

2.5 Air Quality Regulatory Authority

Rosemont will be located within the Pima Intrastate Air Quality Control Region (AQCR) which encompasses Pima County. The Pima County Department of Environmental Quality (PCDEQ) permits and regulates most stationary sources of emissions located within their jurisdiction although ADEQ retains original jurisdiction over some types of sources as provided in §49-402(B) of the Arizona Revised Statutes (ARS). An application for an air quality permit was initially submitted to PCDEQ. However, the existing Pima County State Implementation Plan is inconsistent with state law in that it further grants jurisdiction of certain other sources (such as Rosemont) to ADEQ. As a result, while state law would indicate that PDEQ is the appropriate air permitting authority for Rosemont, the Pima County SIP requires otherwise. The PCDEQ has denied the issuance of an air quality permit and Rosemont has therefore submitted an application for a Class II air permit to ADEQ.

3. DISPERSION MODELING INPUT DATA AND DEFAULTS

The dispersion modeling was conducted using the PSD regulatory guideline dispersion model developed by the EPA in conjunction with the American Meteorological Society (however, as previously stated, Rosemont is not subject to PSD requirements). The model is called the AMS/EPA Regulatory Model, or AERMOD. Evaluation of the maximum ambient air quality impacts from the proposed Rosemont Project was conducted using the latest version of AERMOD (*User's Guide for the AMS/EPA Regulatory Model – AERMOD,* U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division, Research Triangle Park, North Carolina, EPA-454/B-03-001, September 2004), version 12060. JBR Environmental Consultants, Inc. (JBR) uses the commercial version of AERMOD from BEE-Line Software (P.O. Box 7348, Asheville, NC 28802, (828) 628-0636).

EPA's *Guideline on Air Quality Models* addresses the regulatory application of air quality models for assessing criteria pollutants under the Clean Air Act[1]. Appendix A of the *Guideline* identifies AERMOD as the preferred model for a wide range of regulatory applications. The AERMOD modeling system consists of one main program (AERMOD) and two pre-processors (AERMET and AERMAP). The major purpose of AERMET is to calculate boundary layer parameters for use by AERMOD. The major purpose of AERMAP is to calculate terrain heights and receptor grids for AERMOD. Both AERMET and AERMAP require observational data to parameterize the growth and structure of the atmospheric boundary layer. AERMOD uses terrain, boundary layer and source data to model pollutant transport and dispersion for calculating temporally averaged air pollution concentrations.

AERMOD's three models and required model inputs are as follows:

1) AERMET: calculates boundary layer parameters for input to AERMOD
    a. Model inputs: wind speed; wind direction; cloud cover; ambient temperature; morning sounding; albedo; surface roughness; Bowen ratio
    b. Model outputs for AERMOD: wind speed; wind direction; ambient temperature; lateral turbulence; vertical turbulence; sensible heat flux; friction velocity; Monin-Obukhov Length
2) AERMAP: calculates terrain heights and receptor grids for input to AERMOD
    a. Model inputs: DEM data [x,y,z]; design of receptor grid (pol., cart., disc.)
    b. Model outputs for AERMOD: [x,y,z] and hill height scale for each receptor
3) AERMOD: calculates temporally-averaged air pollution concentrations at receptor locations for comparison to the NAAQS
    a. Model inputs: source parameters (from permit application); boundary layer meteorology (from AERMET); receptor data (from AERMAP)

1 "Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions: Summary (Final Rule)." Federal Register 70:216 (9 November 2005) p. 68218

b. Model outputs: temporally averaged air pollutant concentrations

3.1 Recommended Regulatory Default Options

The following recommended regulatory default options for AERMOD as stated in the *Guideline* were used for the model runs: stack-tip downwash, incorporation of the effects of elevated terrain, and calms and missing data processing routines.

3.2 Missing Data Processing Routines

The missing data processing routines that are included in AERMOD allow the model to handle missing meteorological data in the processing of short term averages. The model treats missing meteorological data in the same way as the calms processing routine (i.e., it sets the concentration values to zero for that hour and calculates the short term averages according to EPA's calms policy, as set forth in the Guideline). Calms and missing values are tracked separately for the purpose of flagging the short term averages. An average that includes a calm hour is flagged with a 'c', an average that includes a missing hour is flagged with an 'm', and an average that includes both calm and missing hours is flagged with a 'b'. If the number of hours of missing meteorological data exceeds 10 percent of the total number of hours for a given model run, a cautionary message is written to the main output file, and the user is referred to Section 5.3.2 of *On-site Meteorological Program Guidance for Regulatory Modeling Applications* (EPA, 1987).

3.3 Regional Topography

Rosemont will be located in the Santa Rita Mountains which trend northeast to southwest with elevations ranging from 4,500 feet to over 6,000 feet (See Section 1.5). To the west of the mountain range lies the broad Santa Cruz River Valley and to the east of the mountains lies a smaller valley bisected by Cienega Creek.

3.4 Rural/Urban Classification

For modeling purposes, the rural/urban classification of an area is determined by either the dominance of a specific land use or by population data in the study area. Generally, if the sum of heavy industrial, light-moderate industrial, commercial, and compact residential (single and multiple family) land uses within a three kilometer radius from the facility are greater than 50%, the area is classified as urban. Conversely, if the sum of common residential, estate residential, metropolitan natural, agricultural rural, undeveloped (grasses), undeveloped (heavily wooded) and water surfaces land uses within a three kilometer radius from the facility are greater than 50%, the area is classified as rural. Alternatively, if the population is greater than 750 persons per km^2, the area is also classified as urban.

As shown in the aerial photograph and the topographic map in Figures 1.1 and 3.1, rural land use in the area surrounding the proposed Rosemont Project is much greater than 50%. Thus, the rural classification was used in the modeling.

3.5 Regional Climatology

The climate of the Rosemont area is semi-arid with precipitation varying with elevation and season. The 30-year normal (1971 to 2000) annual average precipitation for the Santa Rita Experimental Range station is 23.41 inches (Western Regional Climate Center). Over this 30-year period, nearly half of the precipitation occurred in the months associated with the Arizona monsoon season comprised of July, August and September. The least amount of precipitation occurred during the months of April, May and June.

Temperatures regionally are moderate to extreme with maximums and minimums also varying with elevation. The 30-year normal average monthly maximum temperatures at the Santa Rita Experimental Range station ranged from a low of 60.4°F in January to a high of 93.3°F in June. Average monthly minimum temperatures ranged from a low of 37.5°F in December and January to a high of 66.8°F in July.

On-site meteorological monitoring was performed to obtain site-specific temperature and wind data as described in further detail in Section 3.6.

3.6 Meteorological Monitoring for On-Site Data

On-site meteorological monitoring was initiated by Rosemont in April 2006 and is continuing to date. Complete quarterly data summary and semi-annual audit reports have been submitted to the ADEQ since the monitoring began. Detailed results of the monitoring program can be found in these quarterly reports. On-site monitoring was performed in accordance with EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications*.

The modeling was based upon the on-site weather observations from the Rosemont monitoring site, which is located at the center of the proposed open pit at an elevation of 5,350 feet as shown in Figure 5.1 . Parameters measured at the Rosemont monitoring site include ambient temperature at 2 meters, differential temperature between 2 and 10 meters, and wind speed and wind direction at 10 meters. The monitoring site was chosen following EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA-454/R-99-005, February 2000). A monitoring protocol entitled *Monitoring Protocol and Quality Assurance Project Plan for Conducting Ambient PM_{10} and Meteorological Monitoring for the Proposed Rosemont Copper Mine Pima County, Arizona* (July 1, 2006) (Monitoring Protocol and QAAP) was submitted to ADEQ and is available at http://www.rosemonteis.us/documents/013220. Quarterly reports of the meteorological measurements were subsequently submitted to ADEQ.

As stated above, monitoring began in April 2006 and is on-going. The database, however, is not continuous as data between December 2006 and February 2007 were lost due to a data logger malfunction (see quarterly and audit reports submitted to ADEQ). The modeling was conducted based upon 3 full years of on-site data, with missing data periods filled in with data from other years for the same time period. Wind roses for the data collected in 2006-2007, 2007-2008 and 2008-2009 are presented in Figures 3.2 through 3.4, respectively. The year-to-year consistency in the wind data indicates that meteorological data collection was consistent. The missing data for December 2006 to February 2007 was filled in with data for the same period from the next year.

3.7 Meteorological Data Processing for AERMOD

Meteorological data was combined into AERMOD-ready surface and upper air input files using AERMET. As a regulatory component of the AERMOD modeling system, the AERMET program serves as the meteorological preprocessor for AERMOD. AERMET is designed to combine and quality control on-site and NWS surface and upper air data for use by AERMOD.

3.8 Sky Cover Data

AERMOD requires parameters for determining boundary layer conditions which include opaque sky cover (or total sky cover). The Rosemont on-site surface measurements do not include sky cover data. Per EPA's AERMET guidance, the concurrent sky cover data for the on-site surface meteorological data was obtained from the nearest NWS site, the Tucson Airport (WBAN 23160).

3.9 Upper Air and Surface Meteorological Data

AERMOD also requires upper air data. Only two upper air sites are available for Arizona, Tucson and Flagstaff. The only other nearby upper air data is at Santa Rita, New Mexico, which is approximately 150 miles away from the Rosemont site. Thus, upper air data concurrent with the on-site surface meteorological data was obtained from the NWS Tucson Airport station (WBAN 23160), which is the closest NWS station.

3.10 Surface Characteristics

Surface conditions at the measurement site, referred to as the surface characteristics, influence the boundary layer parameter estimates generated by AERMOD. Obstacles to the wind flow, the amount of moisture at the surface, and reflectivity of the surface all affect the boundary layer estimates. These influences are quantified through the surface albedo, Bowen ratio and roughness length, and are introduced into AERMOD through the files generated by AERMET.

The albedo is the fraction of total incident solar radiation reflected by the surface back to space without absorption. Typical values range from 0.1 for thick deciduous forests to 0.90 for fresh snow. The daytime Bowen ratio, an indicator of surface moisture, is the ratio of the sensible heat flux to the latent heat flux and is used for determining planetary boundary layer parameters for convective conditions. While the diurnal variation of the Bowen ratio may be significant, the Bowen ratio usually attains a fairly constant value during the day. Midday values of the Bowen ratio range from 0.1 over water to 10.0 over desert. The surface roughness length is related to the height of obstacles to the wind flow and is, in principle, the height at which the mean horizontal wind speed is zero. Values range from less than 0.001 m over a calm water surface to 1 m or more over a forest or urban area. The values for surface albedo, Bowen ratio and roughness length can be entered into the AERMET preprocessor based on frequency and sector. The frequency defines how often these characteristics change, or alternatively, the period of time over which these characteristics remain constant.

The frequency defines how often these characteristics change, or alternatively, the period of time over which these characteristics remain constant. The frequency can be annual, seasonal (winter [December, January, February], spring [March, April, May], summer [June, July, August], fall

[September, October, November]), or monthly, corresponding to 1, 4, or 12 periods, respectively. Sectors refer to the number of non-overlapping sectors into which the 360° compass is divided.

A minimum of 1 and a maximum of 12 sectors can be specified (i.e., 1 sector of 360°, up to 12 non-overlapping sectors of 30°). Thus, AERMET allows the values for surface albedo, Bowen ratio and roughness length to be entered annually, seasonally or monthly for each sector, the number of which can range between 1 and 12. As shown in the Monitoring Protocol and QAAP, the area surrounding the proposed Rosemont Project is undeveloped, pinyon-juniper mountainous terrain in all directions. Consequently, surface characteristics will be entered for a single sector.

The EPA has developed a computer program called AERSURFACE to aid users in obtaining realistic and reproducible surface characteristic values for the albedo, Bowen ratio, and surface roughness length for input to AERMET. The program uses publicly available national land cover datasets and look-up tables of surface characteristics that vary by land cover type and season. Land cover data (not partitioned) from the USGS NLCD92 was used for the modeling as recommended by the AERSURFACE user guide (http://www.epa.gov/ttn/scram/7thconf/aermod/aersurface_userguide.pdf).

The surface characteristics that were used in the modeling were entered on a seasonal basis and are listed in Table 3.1. The values listed in Table 3.1 were generated by AERSURFACE.

Table 3.1 Surface Characteristics Proposed for Use in the AERMOD Modeling

Surface Characteristic*	Spring	Summer	Autumn	Winter
Albedo	0.25	0.25	0.25	0.25
Bowen Ratio	2.88	3.76	5.70	5.70
Surface Roughness	0.153	0.153	0.153	0.152

* Generated by AERSURFACE, dated 0809

- Center UTM Easting (meters): 522896.0; Center UTM Northing (meters): 3521802.0; UTM Zone: 12, Datum: NAD83
- Study radius (km) for surface roughness: 1.0
- Airport? N, Continuous snow cover? N
- Surface moisture? Average, Arid region? Y, Month/Season assignments? Default
- Late autumn after frost and harvest, or winter with no snow: 12 1 2
- Winter with continuous snow on the ground: 0
- Transitional spring (partial green coverage, short annuals): 3 4 5
- Midsummer with lush vegetation: 6 7 8; Autumn with un-harvested cropland: 9 10 11

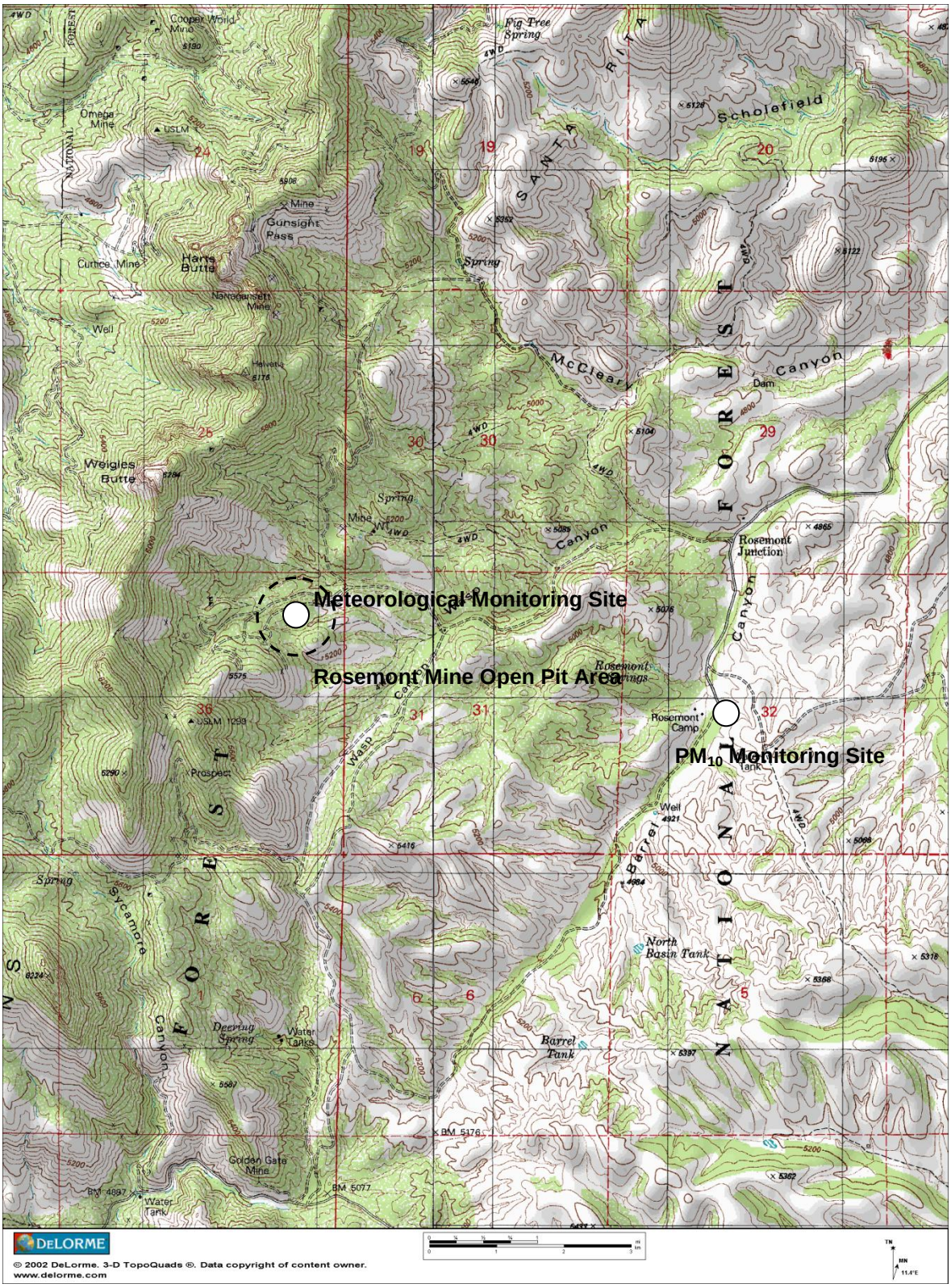


Figure 3.1 Topographic Map Showing Location of the PM_{10} and Meteorological Monitoring Sites.

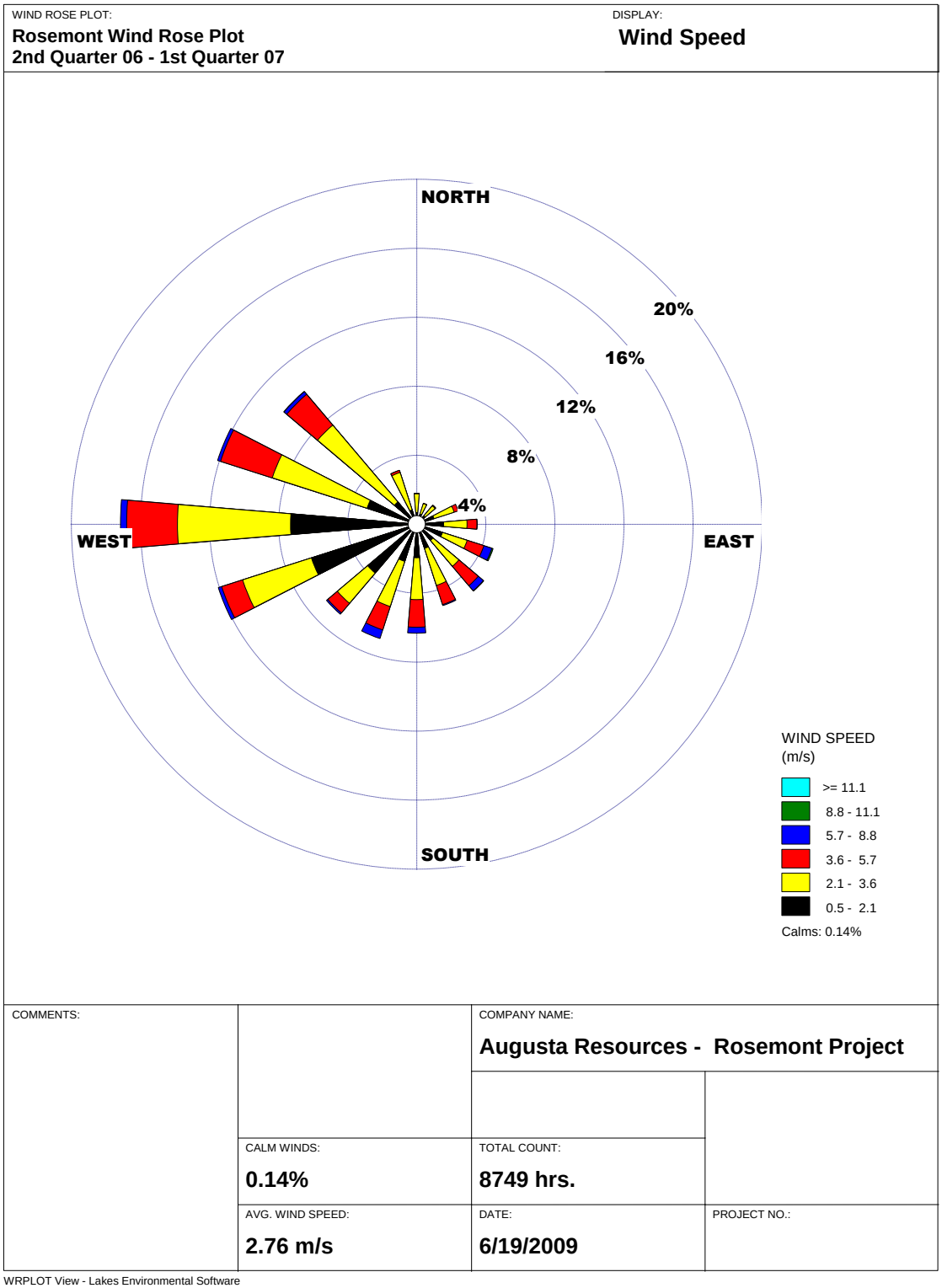


Figure 3.2 Wind Rose for the Rosemont Meteorological Station for the Time Period April 1, 2006 – March 31, 2007.

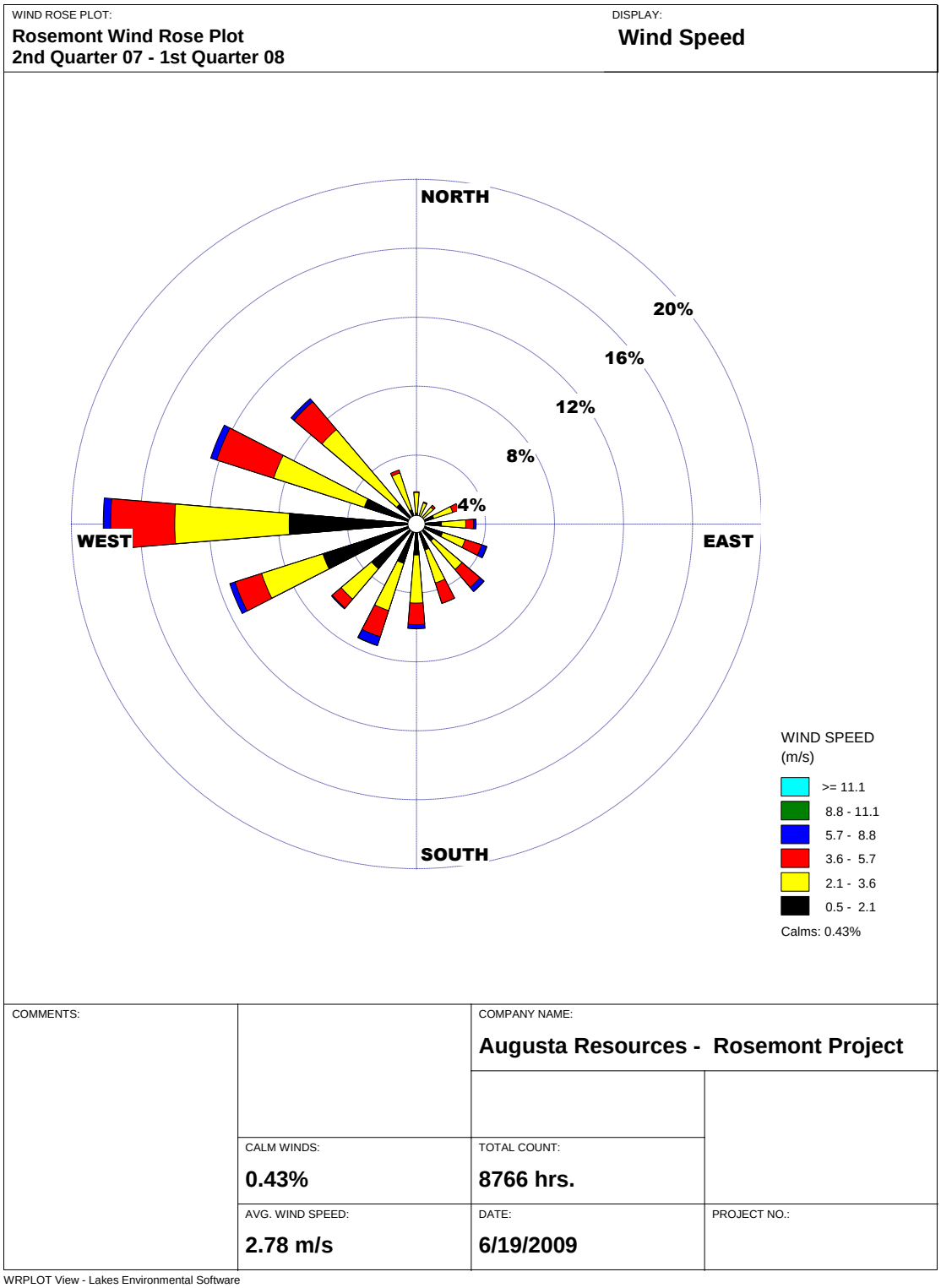


Figure 3.3 Wind Rose for the Rosemont Meteorological Station for the Time Period April 1, 2007 - March 31, 2008.

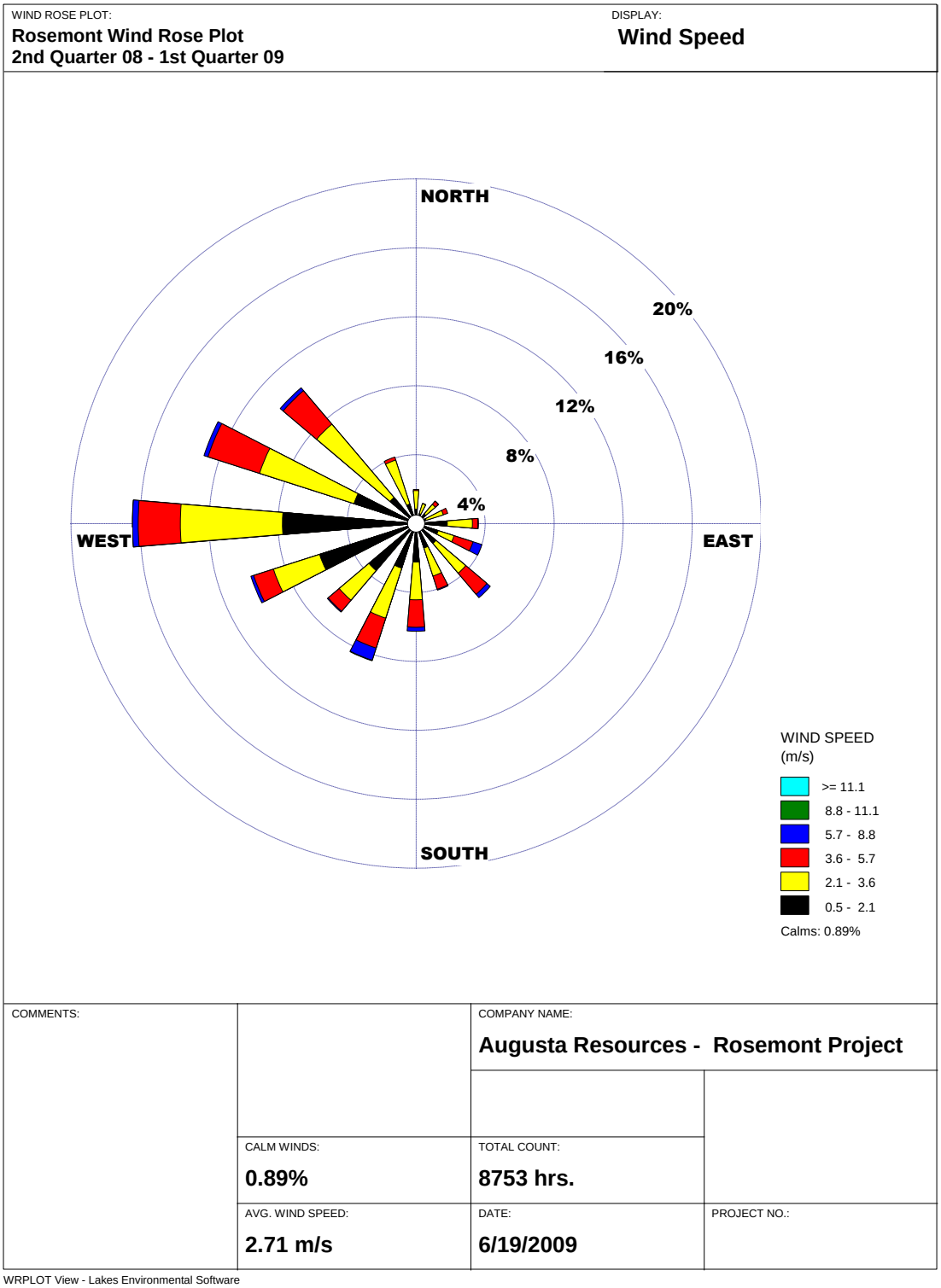


Figure 3.4 Wind Rose for the Rosemont Meteorological Station for the Time Period April 1, 2008 - March 31, 2009.

4. BACKGROUND CONCENTRATIONS

Pollutants directly emitted by operations at Rosemont and under evaluation for dispersion modeling purposes are PM_{10}, $PM_{2.5}$, NO_2, CO, and SO_2. To evaluate the potential impacts of emissions from Rosemont operations on the public, the dispersion modeling evaluation must consider the existing background concentrations of pollutants in the area where impacts are being evaluated. The background concentration of a given pollutant is added to the modeled impact from Rosemont operations, and the result is compared to the NAAQS for that pollutant.

For this modeling analysis, potential air quality impacts were evaluated near the Rosemont location within a 10 km radius from the project site. This radius suffices to capture the maximum impacts as all emission sources at Rosemont are at or near ground-level, causing impacts to decrease with distance from Rosemont. Background concentrations for various pollutants and averaging periods that represent local conditions were evaluated. The selected background concentrations for each pollutant at Rosemont were chosen in order to best represent existing background pollutant concentrations at the site since no on-site data exists for pollutants other than PM_{10}.

4.1 PM_{10}

Rosemont initiated pre-application air quality monitoring for PM_{10} in June 2006. At that time it was undetermined whether the project would trigger PSD permitting for PM_{10}, so the on-site monitoring was performed in compliance with the PSD regulations. The monitoring ended in June 2009. The location of the monitoring site is shown in the Monitoring Protocol and QAAP. Complete quarterly data summary and audit reports have been submitted to the ADEQ since the monitoring began. Detailed results of the monitoring program can be found in these quarterly reports and the quarterly summaries are presented in Appendix B. The on-site PM_{10} data was used to define background concentrations for locations near Rosemont.

As stated in the November 9, 2005 *Revision to the Air Quality Models* (found at 40 CFR 51 Appendix W) that is applied to PSD permitting and can be followed in this case as a guideline for non-PSD modeling, the 24-hr PM_{10} background concentration was based on the average of the highest 24-hr concentrations recorded for each year. With respect to determination of this value, ambient PM_{10} monitoring commenced at the start of the 3rd quarter of 2006. Annual time periods are thus defined as the time period from July of one year through June of the following year. A listing of the highest and second highest concentrations for the three year period is tabulated in Table 4.1.

Table 4.1 PM_{10} Monitoring Results

Year	Highest Concentration ($\mu g/m^3$)	2nd Highest Concentration ($\mu g/m^3$)
July 2006 -June 2007	71.3	27.0
July 2007 -June 2008	40.3	28.2
July 2008 - June 2009	31.6	21.2

The high concentration of 71.3 $\mu g/m^3$ was recorded on the second day of the monitoring program and is not representative of the typical background concentration observed at the Rosemont site. Likewise, the measured ambient PM_{10} concentration of 40.3 $\mu g/m^3$ appears to be abnormally high in comparison to other monitored concentrations.

Statistical analyses were performed to quantitatively evaluate whether these data points are legitimate and should be included in the calculation of the PM_{10} background concentration. The statistical analyses provided in Appendix C show that the monitored concentration of 71.3 $\mu g/m^3$ is an extreme outlier and the second highest monitored concentration of 40.3 $\mu g/m^3$ is an outlier.

Additional qualitative analysis has been performed to evaluate whether the high data point generally meets the criteria required of an "exceptional event" under 40 CFR Part 50 §§50.1(j), (k), and (l), and 50.14, *Treatment of air quality monitoring data influenced by exceptional events*. The rule guiding the determination of whether a high monitored value is an exceptional event applies to air quality regulatory agencies that are seeking to determine an area's NAAQS attainment or nonattainment status. It does not apply to individual sources or on-site monitoring. However, since the Rosemont project is also not subject to monitoring or modeling under PSD, the exceptional event evaluation process used by States does generally provide a reasonable framework for evaluating whether the high monitored value at the Rosemont site should be included in determining the PM_{10} background concentration.

Per 40 CFR Part 50 and the Preamble to the Final Rule at 72 FR 13560, an exceptional event:

(i) Affects air quality as established by an air quality impact that:

1. Falls above the level of the applicable standard; and
2. Is significantly beyond the normal fluctuating range of air quality, including background air quality concentrations, and
3. Should be large enough that without it there would have been no exceedances

(ii) Is an event that is not reasonably controllable or preventable;

(iii) Is an event caused by human activity that is unlikely to recur at a particular location or a natural event; and is

(iv) Determined by EPA to be an exceptional event

While the above criteria clearly apply to States that are using monitored data to evaluate attainment status and not to sources, all available information regarding the monitored concentration of 71.3 $\mu g/m^3$ indicates that it should be excluded. Since dispersion modeling is being performed to evaluate the project's anticipated effects on ambient air quality as determined through comparison with the NAAQS, a similar approach for excluding a high data point due to an exceptional event is appropriate in this case.

As described in Appendix K of 40 CFR Part 50—Interpretation of the National Ambient Air Quality Standards for Particulate Matter, a State or other air quality jurisdiction that is evaluating the monitored concentrations of PM_{10} to determine whether the area is or is not in compliance with the NAAQS can exclude high data points under certain circumstances. This is because the Clean Air Act and EPA recognize that including in the computation of exceedances or averages a high value that is due to an exceptional event could result in inappropriate estimates of expected annual values. Including high values that are very unlikely to recur could place an area in nonattainment for reasons over which it has no control and for which regulatory control measures would have essentially no effect.

The Clean Air Act states that air quality data should be carefully screened to ensure that events not likely to recur are represented accurately in all monitoring data and analyses (42 U.S.C. 7619(b)(3)(A)). Based on the above considerations, the monitored concentration of 71.3 $\mu g/m^3$ should not be used. Instead, the next highest monitored concentration that occurred during the monitoring period, 40.3 $\mu g/m^3$, should be used in its place. This is a conservative value, because as shown in Table 4.1, the second highest PM_{10} concentration recorded during the first year of monitoring is 27.0 $\mu g/m^3$.

The background concentration for evaluating predicted impacts with the 24-hour PM_{10} NAAQS would be the mean of the highest values in Table 4.1 with 71.3 $\mu g/m^3$ replaced by 40.3 $\mu g/m^3$. This value comes out to be 37.4 $\mu g/m^3$ and was used as the background concentration in this modeling analysis.

4.2 $PM_{2.5}$

To obtain a representative background concentration for $PM_{2.5}$ in the vicinity of Rosemont, a number of monitoring sites were evaluated to determine which site most closely reflected the conditions near Rosemont. The closest $PM_{2.5}$ monitors—located by straight-line distance from Rosemont—were in the Tucson metropolitan area.

The Rosemont site is located in the Santa Rita Mountains which trend northeast to southwest. Elevations range from 4,500 feet to over 6,000 feet and feature complex terrain. The approximate elevation of the Rosemont site itself is 5350 feet. The nearest sources of emissions were in the small community of Green Valley located 15 miles to the west of Rosemont and several industrial facilities located 3 to 8 miles further west. These sources were distant from the Rosemont site and on the other side of the Santa Rita Mountains. Since proposed Rosemont facility is not located near any existing monitors, nor are the locations of the existing Pima County monitors representative of the Rosemont site due to the significant urban influences that are nonexistent near Rosemont, it was necessary to evaluate other monitors to obtain background data for evaluating the impacts in the vicinity of the facility.

Two EPA IMPROVE monitoring sites, the Saguaro National Monument (NM) site and Chiricahua National Monument (NM) site, were evaluated for background data for the $PM_{2.5}$ modeling analysis. The Saguaro NM monitor is at an elevation of 3080 ft and located in close proximity to the Tucson metropolitan area, and thus influenced by urban and industrial emissions from Tucson. The Chiricahua NM monitor located in Cochise County is at an elevation of 5150 feet, similar to that of Rosemont, and is surrounded by similar complex terrain features like the Rosemont site. The

physical characteristics of the terrain near the Chiricahua National Monument monitoring site are significantly more representative of the terrain in the vicinity of the Rosemont site compared to the Saguaro National Park East terrain characteristics. Emission sources impacting the Chiricahua National Monument monitoring site are more closely representative of the sources impacting the Rosemont site than the sources impacting the Saguaro National Park East monitoring site. Thus the Chiricahua NM site was selected for background data, as it was more representative of the Rosemont site on account of its similar terrain features, elevation and remoteness from emission sources.

EPA published a memorandum titled, "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS" on March 23, 2010 that states the following: "The representative monitored $PM_{2.5}$ design value, rather than the overall maximum monitored background concentration, should be used as a component of the cumulative analysis. The $PM_{2.5}$ design value for the annual averaging period is based on the 3-year average of the annual average $PM_{2.5}$ concentrations; for the 24-hour averaging period, the design value is based on the 3-year average of the 98^{th} percentile 24-hour average $PM_{2.5}$ concentrations for the daily standard. Details regarding the determination of the 98^{th} percentile monitored 24-hour value based on the number of days sampled during the year are provided in the ambient monitoring regulations, Appendix N to 40 CFR Part 50."

The 3 year (2008-2010) 98^{th} percentile average of the maximum 24-hr concentrations was 7.2 $\mu g/m^3$ whereas the 3 year average of the annual average concentrations was 3.1 $\mu g/m^3$. These values were used as background concentrations for 24-hr and Annual $PM_{2.5}$ modeling analysis.

4.3 NO_2

Emissions from Rosemont operations include tailpipe emissions from mobile equipment conducting mining operations in addition to minor fuel combustion sources used in ore processing operations. Tailpipe emissions from mobile sources are not considered in applications for air quality permits, but those emissions were included in this modeling analysis. This modeling analysis includes emissions from both process sources and mobile sources. Tail pipe emissions are generally comprised primarily of both NO_x and CO.

Nitrogen dioxide (NO_2) is formed by the oxidation of nitric oxide (NO) which is a byproduct of combustion. Ambient NO_2 concentrations for locations in Arizona are currently monitored only in urban areas and near coal fired power plants. One rural monitoring site where emissions are due to minor vehicle traffic and outboard motorboats on Alamo Lake was in place during 2005–2006. There are no monitoring sites in the vicinity of the proposed Rosemont project. Table 4.2 provides the NO_2 monitoring station locations in Arizona and the maximum one-hour average NO_2 concentrations monitored from 2005 through 2008 as reported by ADEQ in the Air Quality Annual Reports (available at http://www.azdeq.gov/function/forms/reports.html).

Urban areas are very highly influenced by emissions from vehicle traffic that do not exist near Rosemont. As a result, those monitoring locations are not representative of existing NO_2 background concentrations near Rosemont. Coal-fired power plants are significant sources of NO_2 and monitoring data from those locations do not represent existing background NO_2 concentrations near Rosemont. The only remaining monitor in Arizona that could be considered representative of NO_2 background concentrations for Rosemont is located at Alamo Lake.

The Rosemont site is similar to the Alamo Lake site in that the only sources of NO_2 are minor vehicle traffic on a road approximately 2.5 miles from the site. Both locations are rural. The highest background 1-hr NO_2 concentration recorded at the Alamo Lake site measured during a two year monitoring program (2005-2006) was 24.5 $\mu g/m^3$ (note that the ADEQ Air Quality Annual Reports show NO_2 concentrations in ppm, not $\mu g/m^3$). The second-highest monitored 1-hour concentration was 20.7 $\mu g/m^3$. For purposes of selecting a background NO_2 concentration at the Rosemont site, the highest of the two years, 24.5 $\mu g/m^3$ was used as the 1-hr background NO_2 concentration. Use of the highest monitored Alamo Lake 1-hour NO_2 value represents a conservative estimate of NO_2 background.

Table 4.2 Maximum Monitored Value of the One-Hour Average NO_2 Concentration (ppm)

Monitoring Station	Location Type	2005	2006	2007	2008
Apache County					
TEP – Springerville – Coyote Hills	Coal-fired power plant	0.014	0.018	0.037	0.025
La Paz County					
Alamo Lake[a]	Rural	0.011	0.013	-	-
Maricopa County					
Buckeye	Urban	0.053	0.047	0.069	0.059
Central Phoenix	Urban	0.095	0.085	0.077	0.076
Greenwood	Urban	0.131	0.111	0.094	0.138
JLG Supersite[b]	Urban	0.077	0.067	0.076	0.073
South Scottsdale	Urban	0.079	0.065	0.068	0.063
West Phoenix	Urban	0.100	0.092	0.082	0.065
Pima County					
22nd St. & Craycroft - Tucson	Urban	0.056	0.051	0.058	0.054
Childrens Park - Tucson	Urban	0.049	0.054	0.049	0.049
Yuma County					
Yuma Game & Fish[c]	Urban	0.051	0.067	0.060	-

[a] Seasonal Monitor – operated May 20 – December 31, 2005 and April – October, 2006.
[b] Seasonal Monitor – operated January 1 – April 30 and October 1 – December 1, 2008.
[c] Seasonal Monitor – operated April 1, 2005 – April 12, 2007.

4.4 CO

CO is produced by the incomplete combustion of fuels with anthropogenic activities (automobiles, construction equipment, lawn and garden equipment, commercial and residential heating, etc.) representing the major source of emissions. Consequently, the CO monitoring sites in Arizona are located exclusively in urban areas (Phoenix, Tucson and Casa Grande) and there are no representative monitoring stations to determine background CO concentrations.

The ADEQ recommended CO background concentrations for rural areas with no major sources of CO for both the 1-hour and 8-hour averaging periods are 582 $\mu g/m^3$ (correspondence with the ADEQ see Appendix E). These values were used as background CO concentrations in this modeling analysis.

4.5 SO_2

Historically, the principal sources of SO_2 emissions in Arizona have been copper smelters and coal-fired power plants. The non-urban SO_2 monitoring sites in Arizona are located in areas near smelters, including Miami, Globe, and Hayden, and near coal-fired power plants, including Springerville, Page, and Bullhead City. To evaluate whether SO_2 is a pollutant of concern for large populations of people in Arizona, SO_2 monitors are also located in the urban areas of Phoenix and Tucson. Since the Rosemont site is neither near a copper smelter or coal-fired power plant, nor located near an urban area, there are no representative monitoring stations to determine background SO_2 concentrations.

The ADEQ-recommended SO_2 background concentrations for rural areas with no major sources of SO_2 for the 3-hour, 24-hour and annual averaging periods are 43 $\mu g/m^3$, 17 $\mu g/m^3$ and 3 $\mu g/m^3$, respectively (communications with the ADEQ; see Appendix E). These values were used as background 3-hour, 24-hour and annual SO_2 concentrations in this modeling analysis. In the absence of available 1-hour SO_2 background data, the 99^{th} percentile highest 1-hour impact from the Rosemont facility was used as the background concentration.

4.6 Pollutant Transport to Rosemont

Transport of emissions to the Rosemont site from Tucson and Interstate 10 (I-10) to effect background concentrations at the site is highly unlikely as illustrated by wind roses for the Rosemont site (Figures 3.2 through 3.4) and for the Tucson airport (Figure 4.1). Rosemont wind patterns have a very strong western component with almost no northerly component. This is primarily due to the site's location on the eastern slope of the Santa Rita mountains, which extend to the north-northeast and to the south of the site.

Any emissions transported toward Rosemont from the north or northwest, such as from the Tucson metropolitan area, would have to travel over or around the higher elevations in those directions. Any emissions transported toward Rosemont from the east would have to overcome the frequent, relatively strong winds from the west. The wind rose from the Tucson airport as shown in Figure 4.1 exhibits a pronounced southeasterly component directing emissions away from the site. The primary Tucson winds and their accompanying emissions tend to blow away from the Rosemont location, which is at a distance of approximately 30 miles and over elevations greater than those at Rosemont.

The Rosemont location is approximately 15 miles south of Interstate 10 (I-10), which runs primarily from east to west. The interstate changes direction at a point almost due north of Rosemont and begins heading northwest. As indicated in Figures 3.2 through 3.4, the frequency of winds from the direction of I-10 to the Rosemont site is less than 5%. Vehicle emissions could potentially be transported from I-10 to the Rosemont site. However, the winds at Rosemont only rarely blow from the north or northeast. The relative frequency and strength with which the winds at Rosemont blow from the west make it highly unlikely that vehicle emissions originating at I-10 from the north and

northeast can overcome local wind conditions at Rosemont to produce an impact that is greater than the proposed background concentrations. Aside from the very low frequency of winds from the Tucson and I-10 areas to Rosemont, it should also be noted that the highest impacts from a stationary source usually occur under stable meteorological conditions. Such conditions generally occur during calm conditions characterized by down slope winds from elevated terrain to lower elevations. Upslope winds from low elevations to higher elevations generally occur during less stable conditions that produce lower impacts. The Rosemont site is in complex terrain at a higher elevation than both Tucson and the I-10.

Consequently any emissions that could be transported from these areas to Rosemont would be greatly dispersed and would occur when Rosemont impacts are at reduced levels. Including additional emissions in the background concentrations during meteorological conditions when Rosemont emissions produce peak impacts would inappropriately skew the modeling. Therefore, while it is theoretically possible that transported emissions could reach Rosemont, there is no indication that use of the proposed methods to determine background pollutant concentrations for modeling, which are based on the regulatory methods, are insufficient.

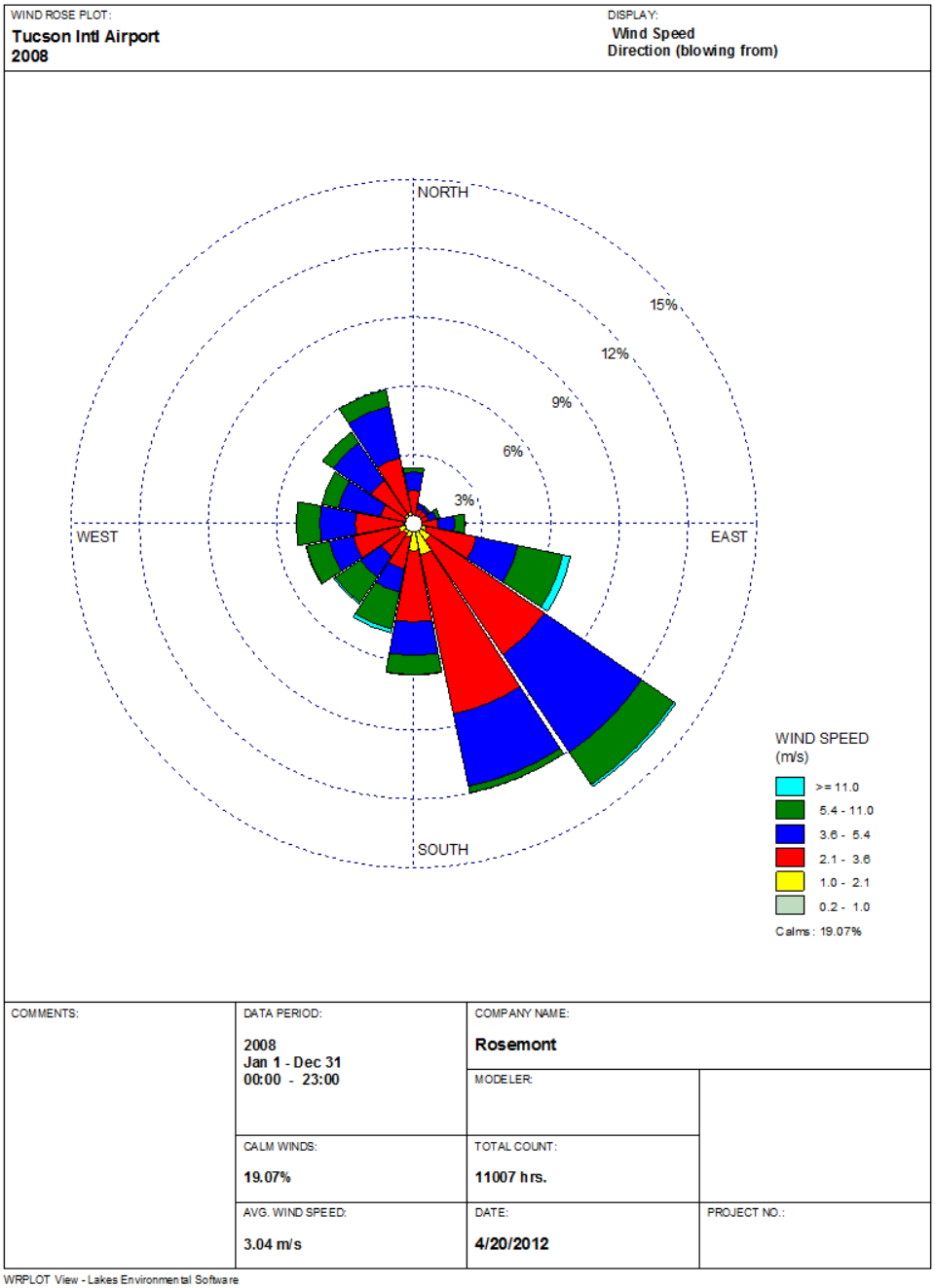


Figure 4.1 Wind Rose for the Tucson Airport

5. MODELING ANALYSIS DESIGN

5.1 Ozone Limiting Method for Evaluating NO_2 Impacts

The Ozone Limiting method (OLM), which is a non-regulatory option in AERMOD, was used to evaluate the impact of NO_2 in the near vicinity of the Rosemont facility. Background ozone data for Chiricahua National Monument was used for the Rosemont near-vicinity impact evaluation.

OLM involves an initial comparison of the estimated maximum NO_x concentration and the ambient ozone concentration to determine the limiting factor in the formation of NO_2. If the ozone concentration is greater than the maximum NO_x concentration, total conversion is assumed. If the NO_x concentration is greater than the ozone concentration, the formation of NO_2 is limited by the ambient ozone concentration. The method also uses a correction factor to account for in-stack conversion of NO_x to NO_2. While the modeling being performed for Rosemont is not subject to the regulatory requirements therein, the use of OLM for the Rosemont modeling analysis is based on the requirements of 40 CFR Part 51, Appendix W, 3.2.2(e) being met as follows:

3.2.2(e)(i). The model has received scientific peer review;

- The chemistry for the OLM option has received peer review as noted in "Sensitivity Analysis of PVMRM and OLM in AERMOD" document posted in EPA's SCRAM website. The document indicates that the model appears to performs as expected.

3.2.2(e)(ii). The model can be demonstrated to be applicable to the problem on a theoretical basis;

- The model has been reviewed and the chemistry has been widely accepted by the EPA and other government agencies as being appropriate for addressing the formation of NO_2 and the calculation of NO_2 concentration at receptors downwind. For a given concentration of NO_x emission rate and ambient ozone concentration, the NO_2/NO_x conversion ratio for OLM is primarily controlled by the ground level NO_x concentrations.
- The EPA issued a memorandum dated March 1, 2011 entitled "Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hr NO_2 NAAQS." This memo indicates that the PVMRM method as currently implemented may have a tendency to overestimate the conversion of NO to NO_2 for low-level plumes by overestimating the amount of ozone available for the conversion due to the manner in which the plume volume is calculated. Furthermore, the EPA's Risk and Exposure Assessment (REA) for the most recent NO_2 NAAQS review (EPA, 2008) for the Atlanta area used the OLM option with OLMGROUP ALL to estimate NO_2 concentration from mobile source emissions. The vast majority of the NO_2 emissions at the Rosemont facility will be from mobile sources.
- Additionally, the "Sensitivity Analysis of PVMRM and OLM in AERMOD" report indicates that PVMRM/OLM provides a better estimation of the NO_2 impacts compared to other screening options.

3.2.2(e)(iii). The data bases which are necessary to perform the analysis are available and adequate;

- Hourly background ozone data for the period April 2006 to March 2009 from the Chiricahua National Monument IMPROVE site was used. The Chiricahua NM site is the most representative of the terrain and conditions at the Rosemont site.

3.2.2(e)(iv). Appropriate performance evaluations of the model have shown that the model is not biased towards underestimates;

- Although no assessment of bias has been conducted for the OLM model, based on the "Sensitivity Analysis of PVMRM and OLM in AERMOD" report, OLM was estimated to provide similar or more conservative estimates of concentration than PVMRM and therefore would also be judged to be unbiased toward underestimation.

3.2.2(e)(v). A protocol on methods and procedures to be followed has been established;

- The methods and procedures for conducting an assessment for determining compliance with the 1-hr federal NAAQS was established in the modeling protocol titled " *Rosemont Copper Company AERMOD Modeling Protocol to Asses Ambient Air Quality Impacts* " submitted to ADEQ on December 2, 2011.

EPAs guidance “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 01, 2011” recommends use of an in-stack NO_2/NO_x ratio of 0.5, but allows different ratios to be used provided that available data justifies use. Lower NO_2/NO_x ratios for boilers, blasting and compression ignition internal combustion engines have been recommended by regulatory agencies including the Texas Commission on Environmental Quality (TCEQ) and the San Joaquin Valley Air Pollution Control District (SJVAPCD). The value of 0.1 was the default value in the addendum to the AERMOD user guide “Addendum: User’s Guide for the AMS/EPA Regulatory Model AERMOD, EPA-454/B-03-001, September 2004”. Because the overwhelming majority of NO_x emissions are from mobile sources, an in-stack ratio of 0.05 was used for mobile sources as well as sources with internal combustion engines. To be conservative, blasting NO_x emissions were modeled at the default in-stack ratio value of 0.5 although there have been scientific studies which report lower values. For analysis of the available data and justification pertaining to the NO_2 to NO_x ratio of 0.05, see Appendix F.

The OLM method requires hourly background ozone values to calculate the conversion of NO_2 to NO_x. Hourly background ozone values from the Chiricahua National Monument IMPROVE site were used (see previous section for explanation). This data base is complete with only 4% missing data. The missing data was replaced based on the methodology suggested by ADEQ in its comments to the modeling protocol (See Appendix H). The OLMGROUP option was used which essentially models all the plumes as one combined plume.

5.2 Receptor Network

Following the ADEQ Guidance, the receptor grid (see Figure 5.1) consisting of the following was modeled:

- receptors spaced at 25 meters along the Process Area Boundary (PAB);
- receptors spaced at 100 meters from the PAB to 1 kilometer;
- receptors spaced at 500 meters from 1 kilometer to 5 kilometers;
- receptors spaced at 1000 meters from 5 kilometers to 10 kilometers.

5.3 Receptor Elevations

Receptor elevations were determined from the National Elevation Dataset (NED) distributed by the USGS, which are based on North American Datum 1983 (NAD83). This dataset has a resolution of 1/3 arc-second (or approximately 10 meters).

The NED data was processed with AERMAP. AERMAP, like AERMET, is a preprocessor program which was developed to process terrain data in conjunction with a layout of receptors and sources to be used in AERMOD. For complex terrain situations, AERMOD captures the essential physics of dispersion in complex terrain and therefore, needs elevation data that convey the features of the surrounding terrain. In response to this need, AERMAP first determines the base elevation at each receptor. AERMAP then searches for the terrain height and location that has the greatest influence on dispersion for each individual receptor. This height is referred to as the hill height scale. Both the base elevation and hill height scale data are produced by AERMAP as a file or files which are then inserted into an AERMOD input control file.

5.4 Modeling Domain

The AERMAP terrain preprocessor requires the user to define a modeling domain. The modeling domain is defined as the area that contains all the receptors and sources being modeled with a buffer to accommodate any significant terrain elevations. Significant terrain elevations include all the terrain that is at or above a 10% slope from each and every receptor. BEE-Line's software automatically calculates the modeling domain based on the receptor grid being used and identifies each 7.5-minute DEM quadrangle that must be used in AERMAP to meet the 10% slope requirement.

5.5 Plume Depletion

One other option in the AERMOD model requires particle size data. This option is known as DDEP, which specifies that dry deposition flux values will be calculated. When selected, dry removal (depletion) mechanisms (known as dry plume depletion (DRYDPLT) in the old ISC modeling program and earlier versions of AERMOD) are automatically included in the calculated concentrations. This option was selected in this modeling analysis for receptors exhibiting high particulate impacts in initial modeling runs.

5.6 Building Downwash

Building downwash effects were evaluated by incorporating the appropriate building/structure dimensions into the AERMOD input files using BEE-Line's commercial version of EPA's Building Profile Input Program for PRIME (BPIPPRM) software. The BPIPPRM program is EPA approved and includes the latest EPA building downwash algorithms. The downwash files generated by BPIPPRM program have been included in the modeling files CD accompanying this report.

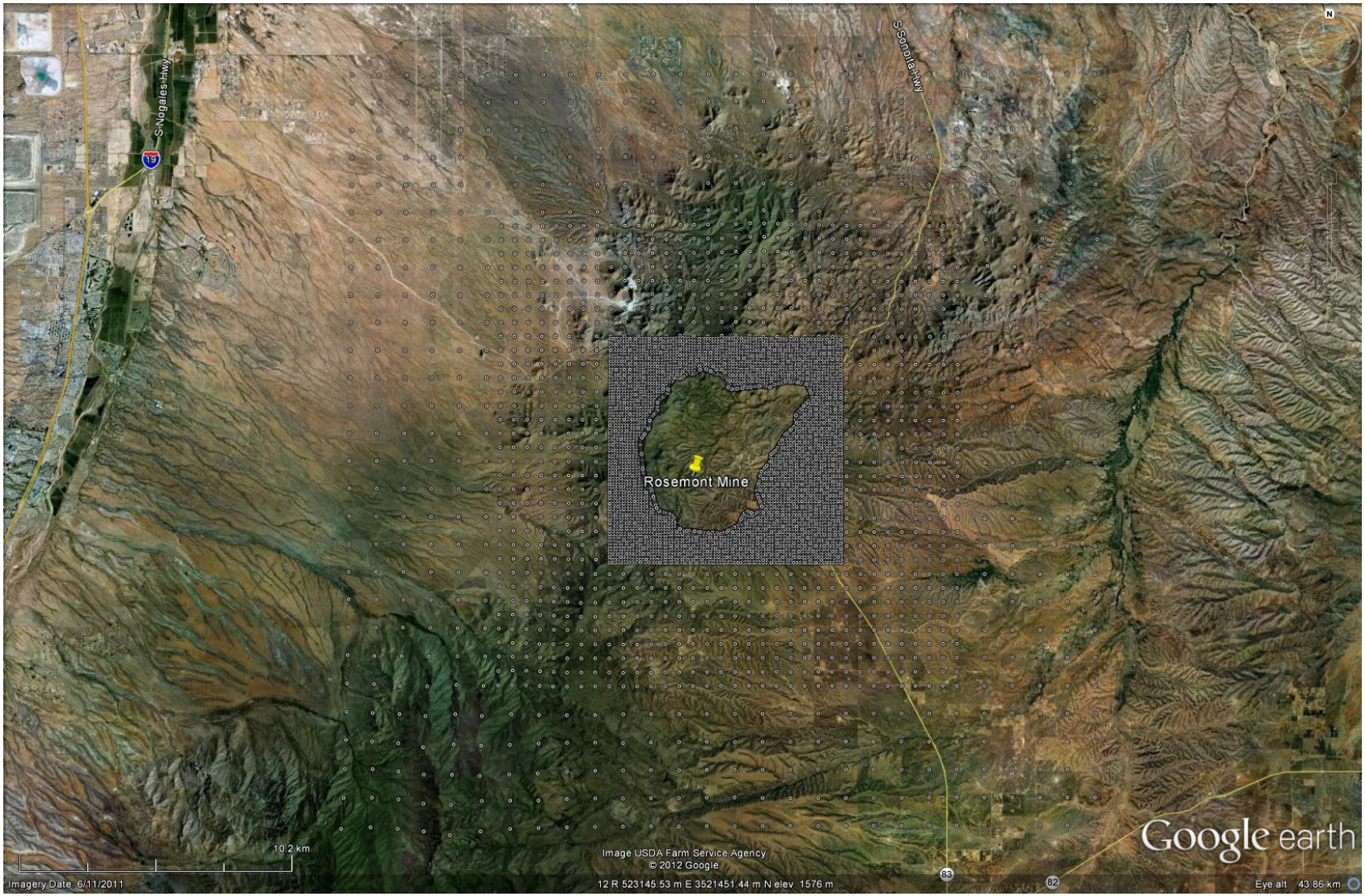


Figure 5.1 Receptor Grid Network used in the Rosemont Modeling Analysis

6. EMISSIONS MODELED AND SOURCE CHARACTERIZATION

A preliminary description of the planned equipment and emission generating processes at Rosemont can be found in the previously referenced *Mine Plan of Operations*. A plan view map depicting the facility layout by Year 5 is presented in Figure 6.1. A preliminary plan view of the ancillary operations, to include locations of the primary crusher and flotation operations, is presented in Figure 6.2. A detailed listing of all emission sources and their corresponding modeling input release parameters and emission rates is provided in Appendix I.

6.1 Operational Years to Be Modeled

A preliminary summary of average and maximum mining rates and haul truck travel (vehicle miles) is presented in Appendix D. This summary is subject to change depending upon any further refinements to the mine plan. The mining information in Appendix D indicates:

- The highest projected annual mining rate and highest haul truck travel outside the pit will occur in Year 1 (approximately 115,000,000 tons of ore and waste per year; 2,237,113 haul truck VMT).

- The highest projected haul truck travel will occur in Year 5 (2,793,243 VMT per year).

Emissions from Rosemont will result from process equipment and mining operations. Process equipment were modeled at maximum capacity. Emissions from mining depend upon the mining rate and haul truck travel necessary to transport the ore and waste from the pit to the primary crusher and the waste rock storage area.

Since haul truck travel is expected to be the primary source of emissions (PM_{10} and tail pipe), Year 5 was modeled. Appendix D also shows that haul truck travel outside the pit is expected to be maximum during Year 1. Since emissions outside the pit are expected to have a greater impact on ambient concentrations than emissions in the pit, this year was also modeled. Emissions, and therefore impacts, during all other years are expected to be less than during these two years.

6.1.1 Annual Criteria Pollutant Emissions Modeling

Annual impacts of particulate and gaseous emissions were based upon emissions calculated using the average daily process rates for Years 1 and 5. The average daily process rate was used for determining annual impacts since it represents expected emissions over the course of a year.

6.1.2 Short-Term Criteria Pollutant Emissions Modeling

Short-term impacts (1-hour, 3-hour, 8-hour and 24-hour) were based upon the emissions calculated using the maximum daily process rates for Years 1 and 5. Short-term impacts are affected by peak emission rates. These are better determined using the expected maximum daily process rates rather than the average daily process rates. For Year 5, the maximum daily process rate was based on the average daily process rate increased by a capacity factor of 20%.

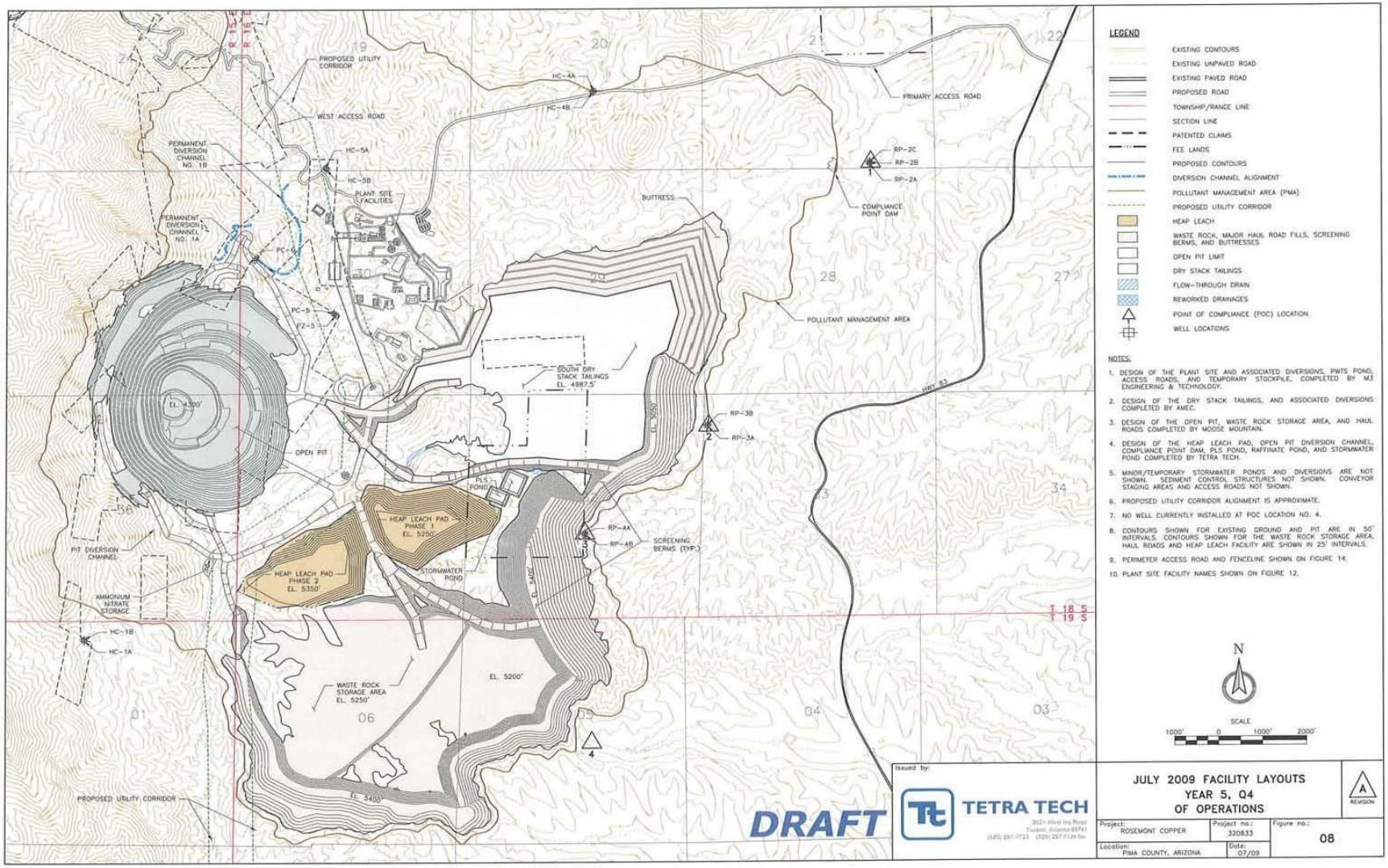


Figure 6.1 Plan View Map of Operations Depicting Facility Layout by Year 5

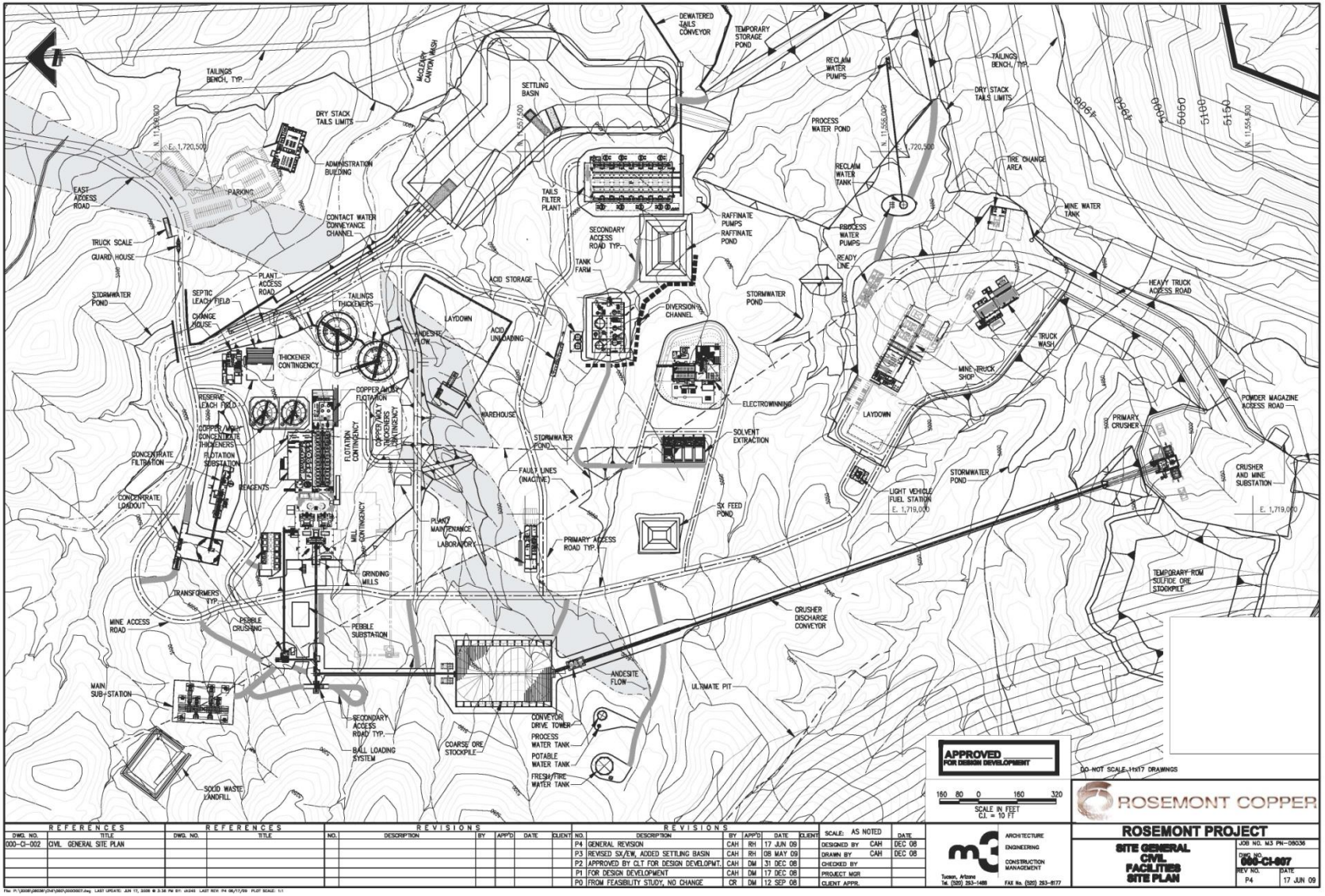


Figure 6.2 Plan View Map of Operations Showing Updated Ancillary Operation Locations for Rosemont

6.2 Point Sources

Point sources at Rosemont include dust collectors, hot water heaters, and emergency generator(s). Emissions from these sources were modeled as individual point sources. Stack parameters for the point sources were based on design parameters and/or conservative estimated values. Particulate emissions from the emergency generators were not included in the PM_{10} modeling since most other operations would be shut down if the generators are needed. Therefore, the generators would not add to peak emissions being modeled. Gaseous emissions from these sources were also not included in the gaseous modeling runs. The point source emissions were modeled using the particle size distribution shown in Table A.13 of Appendix A.

6.3 Volume Sources

Due to the nature of Rosemont's operations, a majority of sources were modeled as volume sources. They are described in the sections below.

6.3.1 Roads

A refined unpaved road network was developed to depict the anticipated haul truck routes and dumping locations during the year of the mine plan with the estimated greatest emissions, which is the basis of the emissions inventory that was used for all of the modeling. Emissions due to haul road and general plant traffic on the paved and unpaved road network were modeled as volume sources and the modeling parameters were based on guidance from ADEQ and the AERMOD User's Guide. The modeling parameters were set as follows:

- volume height was set equal to twice the height of the vehicles generating the emissions;
- initial vertical dimension was set equal to the volume height divided by 2.15;
- release height was set equal to half of the volume height; and
- initial lateral dimension was set to the width of the road divided by 2.15. The road was further divided into two lanes representing 2-way traffic.

The majority of emissions on the haul road network will be due to large haul trucks. The height of the Haul Trucks obtained from the manufacturers data was 6.6 meters (21.6 feet). Thus, for each road source the volume height was set to 13 meters (twice the height of the vehicles generating the emissions rounded to the nearest meter), the initial vertical dimension was set to 6.05 meters (volume height divided by 2.15), and the release height was set to 6.5 meters (half of the volume height). The road width was estimated to be 35 meters. Thus, the initial lateral dimension for each volume was set to 16.3 meters (width of 35 meters divided by 2.15).

The road sources were placed along the road network at approximately 35 meter intervals. According to the mine plan, during Year 1 of operations, 73% of the haul emissions would be generated outside the pit whereas during Year 5, 57% would be generated outside the pit. In-pit traffic versus out-of-pit traffic distributions were taken into account when evaluating the location of haul road emissions. The above distributions were calculated based on maximum daily process rates.

The emissions from dumping to the sulfide ore stockpile, waste rock stockpiles and to the leach pad were also modeled as volume sources. The height of the haul trucks obtained from the manufacturers data was 6.6 meters (21.6 feet). Thus, for each source representing dumping, the volume height was set to 13 meters (twice the height of the vehicles generating the emissions rounded to the nearest meter), the initial vertical dimension was set to 6..05 meters (volume height divided by 2.15), and the release height was set to 6.5 meters (half of the volume height). The width of the trucks (simulating the dump width) obtained from the manufacturers data was 8.7 meters (28.5 feet). Thus the initial horizontal dimension was set to 4 meters (volume width divided by 2.15). The haul road emissions were modeled using the particle size distribution shown in Table A.4 of Appendix A.

The paved roads were similarly modeled. The adjusted width (width of the road plus 6 meters) of the road was set at 16 meters. Thus the initial lateral dimensions of each paved road source was set to 7.44 (adjusted width divided by 2.15). Height of product shipment trucks were estimated to be 5 meters. Thus, for each paved road source the volume height was set to 10 meters (twice the height of the vehicles generating the emissions rounded to the nearest meter), the initial vertical dimension was set to 4.65 meters (volume height divided by 2.15), and the release height was set to 5 meters (half of the volume height). The paved road emissions were modeled using the particle size distribution shown in Table A.16 of Appendix A.

6.3.2 Truck Unloading

Fugitive emissions from truck unloading at the primary crusher were represented by a single volume source. The side length was set to 8.23 meters (approximate width of dump pocket) and therefore, the initial horizontal dimension was set to 1.91 meters (8.23/4.3). The vertical length was set to 3 meters (vertical drop of dump pocket). Consequently, the initial vertical dimension were set to 1.4 meters (3/2.15) and the release height was set to 0 meters (dump pocket is at grade level).

6.3.3 Sulfide Ore Stockpile

Fugitive emissions due to wind erosion from the sulfide ore stockpile were represented by a single volume source. The side length obtained from the map was 318 meters (average width of the stockpile) and therefore the initial horizontal dimension was set to 74 meters (318/4.3). The vertical length was set to 12 meters (average height of stockpile). Consequently, the initial vertical dimension was set to 5.6 meters (12/2.15) and the release height was set to 6 meters (half of the volume height of 12 meters).

6.3.4 Tailings Stockpile

Fugitive emissions due to wind erosion from the Tailings stockpile were represented by a single volume source. Based on the area of tailings stockpile obtained from the map, the side length was estimated to be 2464 meters; and therefore the initial horizontal dimension was set to 573 meters (2464/4.3). The vertical was set to 12 meters (average height of stockpile). Consequently, the initial vertical dimension was set to 5.6 meters (12/2.15) and the release height was set to 6 meters (half of the volume height of 12 meters).

6.3.5 Conveyor Transfer Points

Fugitive emissions from conveyor transfer points were represented by single volume sources. The side length was set to 2 meters (approximate width of the conveyors) and therefore, the initial horizontal dimension was set to 0.5 meters (2/4.3). The vertical length was set to 3 meters (approximate height of material drops from the conveyors). Consequently, the initial vertical dimension was set to 0.7 meters (3/4.3). The release height was set to 3 meters (assumed height of conveyors, except for the conveyors feeding the coarse ore stockpile. The release heights for these sources was set to the actual height of the conveyor at the top of the stockpile. Transfer emissions were modeled using the particle size distribution shown in Table A.7 of Appendix A.

6.3.6 Gaseous Emissions Due to Blasting

The gaseous emissions due to blasting in the pit were modeled as volume sources. The fugitive gaseous emissions due to blasting in the pit were equally spaced at 250 meter intervals (arbitrarily selected) over the pit area. The side length of each volume source was set at 61.0 meters (represents the average width of a blast) and therefore, the initial horizontal dimension was set to 14.2 meters (61.0/4.3).

A typical blast can send emissions 30 meters into the air. Consequently, a conservative vertical dimension of 20 meters was assigned to the volume sources representing the blasting emissions. Thus the initial vertical dimension of each source was set to 9.3 meters (20/2.15) and the release height was set to 10 meters (1/2 of the vertical dimension of 20 meters). The base elevation for the volume sources in the pit were set to the average elevation between the lowest and highest elevation of the terrain defining the bottom and top of the pit, based on the assumption that these emissions must rise above the walls of the pit before being dispersed downwind. Since Rosemont anticipates blasting to occur only between 12 PM and 4 PM, the variable emission rate option HROFDY in AERMOD was used to model the emissions between the above 4 hour interval every day. The PM_{10} emissions from blasting were also modeled as volume sources and used the particle size distribution shown in Table A.10 of Appendix A. For evaluating the 1-hr averaged impacts from NO_2, SO_2 and CO, blasting emissions were set to occur every hour between 12 PM to 4 PM. Test modeling runs indicated that the maximum impact due to blasting emissions occurred at 4 PM every day. Therefore for all impact evaluations greater than the 1-hr averaged impacts, blasting was set to occur at 4 PM every day. The HROFDY variable emissions rate option in AERMOD was used for this.

6.3.7 Open Pit

Fugitive particulate emissions (In-pit haul road emissions and drilling emissions) from the open pit at Rosemont were modeled using the open pit source model as defined by the AERMOD model (only particulate emissions are considered with the open pit source model). Drilling is not a continuous process, and hence related emissions were spread out over a 24 hour period. The open pit source parameters, easterly length, northerly length and volume, were based on the length and width dimensions of the rectangle drawn to simulate the pit shape in the model and the anticipated depth of the pit in the worst case year. The release height was set to zero. The Year 5 mine plan shows a berm developed on the east and south side of the process area boundary. This 150 foot berm essentially covers the waste dump and leach pads on the east and south. Therefore the emissions

generated at the leach pad, waste dump and the haul roads leading up to these dumps were modeled as a second pit with a depth of 150 feet.

The open pit source option in the AERMOD model requires particle size distribution data in the form of the mass-mean particle diameter, mass weighted size distribution, and particle density. Table A.4 shows the particle size distribution developed for haul road emissions. This distribution was used for the open pit source since a majority of the emissions in the pit would be haul road emissions.

A particle density of 2.44 gm/cm^3 was used in the modeling as a representative value of the average density of the various rock materials (overburden, waste rock, ore) that will be mined.

6.3.8 Tail Pipe Emissions

Tail pipe emissions from mobile sources were distributed among road emission sources and the open pit source. The amount of emissions assigned to the road segments and to the pit was based on in-pit and out-of-pit distribution of the vehicle miles travelled (VMT) along the roads and inside the pit. Appendix D provides a breakdown of the in-pit versus out-of-pit traffic. All tailpipe particulate emissions were modeled as $PM_{2.5}$ as recommended by ADEQ. See supporting email correspondence with ADEQ in Appendix E.

7. EVALUATION OF DISPERSION MODELING RESULTS

Evaluation of protection of the NAAQS was performed by comparing the maximum modeled impacts to the applicable standards. All the information necessary for this evaluation including: (a) background concentrations; (b) source location map; (c) complete list of source parameters; (d) complete modeling input and output files; and (e) graphic presentations of the modeling results for each pollutant, showing the magnitude and location of the maximum ambient impacts are presented in the sections below. The modeling results demonstrating the protection of the NAAQS at the Rosemont facility for Year 1 and Year 5 are summarized in Table 7.1 and Table 7.2. The receptor locations of each of the modeled maximum criteria pollutant concentrations are shown in Figures 7.1 and 7.2. The methodology used for evaluating protection of the NAAQS for each pollutant of interest is described below.

7.1 CO Evaluation

For the Year 1 modeling, the predicted highest 2nd high 1-hour and 8-hour CO concentrations were 1480.7 $\mu g/m^3$ and 696.7 $\mu g/m^3$, respectively. These predicted concentrations added to the 1-hour and 8-hour CO background concentrations of 582.0 $\mu g/m^3$ and 582.0 $\mu g/m^3$, yield maximum ambient concentrations of 2062.7 $\mu g/m^3$ and 1278.7 $\mu g/m^3$ respectively. Similarly, for the Year 5 modeling, the maximum 1-hour and 8-hour ambient concentrations were 1906.4 $\mu g/m^3$ and 1227.0 $\mu g/m^3$ respectively. The receptor locations at which these concentrations occurred are shown in Figure 7.1 and 7.2. These concentrations are less than the applicable 1-hour and 8-hour CO NAAQS of 40,000 $\mu g/m^3$ and 10,000 $\mu g/m^3$ respectively.

7.2 NO_2 Evaluation

Although emissions are estimated in terms of total NO_x, only NO_2 has a NAAQS. NO_x emissions from fuel combustion sources are primarily NO (nitrous oxide) which gradually converts to NO_2 over time. Comparison of the maximum predicted NO_x concentrations with the annual NAAQS for NO_2 thus represents a very conservative method of demonstrating protection of NAAQS. Modeling for the 1-hour NO_2 concentration was conducted using the in-stock NO_2/NO_x ratios as described in Section 5.1.

The highest predicted annual NO_2 concentration for the Year 1 modeling was 22.3 $\mu g/m^3$ whereas the 98th percentile 1-hour NO_2 concentration was 139.7 $\mu g/m^3$. The predicted highest annual concentration and 98th percentile 1-hour concentration added to the annual background concentration of 4.0 $\mu g/m^3$ and 1-hour background concentration of 24.5 $\mu g/m^3$ yields a maximum annual and 1-hour ambient concentration of 26.3 $\mu g/m^3$ and 164.2 $\mu g/m^3$ respectively. Similarly, the Year 5 modeling yields a maximum annual and 1-hour ambient concentration of 25.9 $\mu g/m^3$ and 156.9 $\mu g/m^3$ respectively. The receptor location at which these concentrations occurred are shown in Figures 7.1 and 7.2. These concentrations are less than the applicable annual and 1-hr NO_2 NAAQS of 100 $\mu g/m^3$ and 188.6 $\mu g/m^3$.

7.3 PM_{10} Evaluation

The predicted highest 4th high 24-hour PM_{10} concentration for the Year 1 and Year 5 modeling was 99.3 $\mu g/m^3$ and 99.2 $\mu g/m^3$ respectively. These predicted concentrations added to the 24-hour PM_{10}

background concentrations of 37.4 μg/m^3, yield maximum ambient concentrations of 136.7 μg/m^3 and 136.6 μg/m^3, respectively for the Year 1 and Year 5 modeling. The receptor locations at which these concentrations occur are shown in Figure 7.1 and 7.2. These concentrations are less than the applicable 24-hour PM_{10} NAAQS of 150 μg/m^3.

7.4 SO_2 Evaluation

The 99th percentile 1-hour SO_2 concentration and the highest 2nd high 3-hour SO_2 concentration for Year 1 modeling were 22.2 μg/m^3 and 19.5 μg/m^3 respectively. The highest 2nd high 24-hour and annual SO_2 concentrations for the Year 1 modeling were 5.6 μg/m^3 and 0.4 μg/m^3, respectively. These concentrations added to the 1-hour, 3-hour, 24-hour and annual SO_2 background concentrations of 22.2 μg/m^3, 43.0 μg/m^3, 17.0 μg/m^3 and 3.0 μg/m^3, yield maximum ambient concentrations of 44.4 μg/m^3, 62.5 μg/m^3, 22.6 μg/m^3 and 3.4 μg/m^3 respectively. Similarly, the Year 5 modeling yields a 1-hour, 3-hour, 24-hour and annual maximum ambient concentration of 44.3 μg/m^3, 62.4 μg/m^3, 22.5 μg/m^3 and 3.2 μg/m^3 respectively. The receptor locations at which these concentrations occurred are shown in Figure 7.1 and 7.2. These concentrations are less than the applicable 1-hour, 3-hour, 24-hour and annual SO_2 NAAQS of 196 μg/m^3, 1,300 μg/m^3, 365 μg/m^3, and 80 μg/m^3 respectively.

7.5 $PM_{2.5}$ Evaluation

The three year average of the highest high 24-hr and annual concentration for the Year 1 modeling were 19.5 μg/m^3 and 3.8 μg/m^3 respectively. These predicted concentrations added to the 24-hour and annual $PM_{2.5}$ background concentrations of 7.2 μg/m^3 and 3.1 μg/m^3, yield maximum ambient concentrations of 26.7 μg/m^3 and 6.9 μg/m^3 respectively. Similarly the Year 5 modeling yields a 24-hr and annual maximum ambient concentration of 26.5 μg/m^3 and 6.3 μg/m^3 respectively. The receptor locations at which these concentrations occur are shown in Figure 7.1 and 7.2. These concentrations are less than the applicable 24-hour and annual PM_{10} NAAQS of 35 μg/m^3 and 15 μg/m^3 respectively.

Table 7.1 Maximum Ambient Concentrations Due to Emissions for Year 1

Emission Specie	Averaging Period	Modeled Conc. ($\mu g/m^3$)	UTM Easting (m)	UTM Northing (m)	Background Conc. ($\mu g/m^3$)	Maximum Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
CO	1-HR*	1480.7	524723.3	3523654.8	582.0	2062.7	40,000
	8-HR*	696.7	524754.2	3523605.3	582.0	1278.7	10,000
NO_2	1-HR[a]	139.7	525929.1	3520631.1	24.5	164.2	188.6
	ANNUAL	22.3	525934.5	3520655.3	4.0	26.3	100
PM_{10}	24-HR**	99.3	526132.3	3520868.8	37.4[e]	136.7	150
$PM_{2.5}$	24-HR[b]	19.5	524754.2	3523605.3	7.2	26.7	35
	ANNUAL	3.8	526285.6	3521250.0	3.1	6.9	15
SO_2	1-HR[c]	22.2	524754.2	3523605.3	22.2[d]	44.4	195
	3-HR*	19.5	524754.2	3523605.3	43.0	62.5	1,300
	24-HR*	5.6	524754.2	3523605.3	17.0	22.6	365
	ANNUAL	0.4	524764.5	3523588.8	3.0	3.4	80

* Represents the high 2nd high concentration.

** Represents the 4th highest concentration over a 3 year period.

[a] Represents the 98th percentile concentration over a 3 year period

[b] Represents the average of the highest 24-hr concentrations over a 3 year period

[c] Represents the 99th percentile concentration over a 3 year period.

[d] Background Concentration was set equal to the highest modeled impact due to in-availability of appropriate data.

[e] PM_{10} background Concentration was calculated by replacing the outlier value of 71.3 $\mu g/m^3$ with 40.3 $\mu g/m^3$(see Section 4.1). Inclusion of the outlier results in a background concentration of 47.7 $\mu g/m^3$. Adding this to the modeled concentration results in an ambient concentration of 147.0 $\mu g/m^3$.

Table 7.2 Maximum Ambient Concentrations Due to Emissions for Year 5

Emission Specie	Averaging Period	Modeled Conc. ($\mu g/m^3$)	UTM Easting (m)	UTM Northing (m)	Background Conc. ($\mu g/m^3$)	Maximum Ambient Conc. ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
CO	1-HR*	1324.4	524723.3	3523654.8	582.0	1906.4	40,000
	8-HR*	645.0	524754.2	3523605.3	582.0	1227.0	10,000
NO_2	1-HR[a]	132.4	524754.2	3523605.3	24.5	156.9	188.7
	ANNUAL	21.9	525934.5	3520655.3	4.0	25.9	100
PM_{10}	24-HR**	99.2	524754.2	3523605.3	37.4[e]	136.6	150
$PM_{2.5}$	24-HR[b]	19.3	524754.2	3523605.3	7.2	26.5	35
	ANNUAL	3.2	525929.1	3520631.1	3.1	6.3	15
SO_2	1-HR[c]	22.1	524754.2	3523605.3	22.2[d]	44.3	195
	3-HR*	19.4	524754.2	3523605.3	43.0	62.4	1,300
	24-HR*	5.5	524754.2	3523605.3	17.0	22.5	365
	ANNUAL	0.2	524764.5	3523588.8	3.0	3.2	80

* Represents the high 2nd high concentration.

** Represents the 4th highest concentration over a 3 year period.

[a] Represents the 98th percentile concentration over a 3 year period

[b] Represents the average of the highest 24-hr concentrations over a 3 year period

[c] Represents the 99th percentile concentration over a 3 year period.

[d] Background Concentration was set equal to the highest modeled impact due to in-availability of appropriate data.

[e] PM_{10} background Concentration was calculated by replacing the outlier value of 71.3 $\mu g/m^3$ with 40.3 $\mu g/m^3$(see Section 4.1). Inclusion of the outlier results in a background concentration of 47.7 $\mu g/m^3$. Adding this to the modeled concentration results in an ambient concentration of 146.9 $\mu g/m^3$.

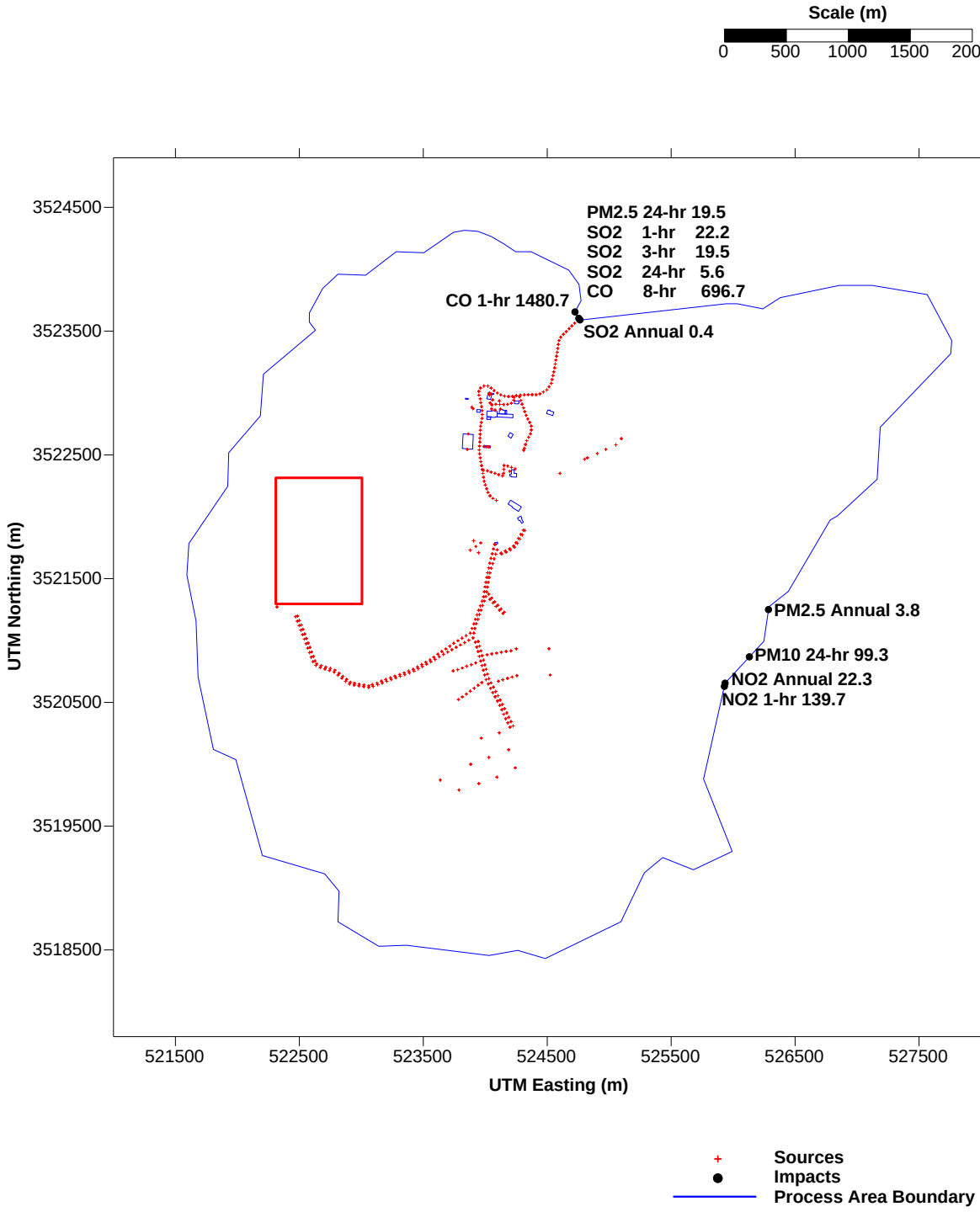


Figure 7.1 Receptor location of Modeled Impacts due to emissions for Year 1 (Concentrations are listed in units of µg/m^3)

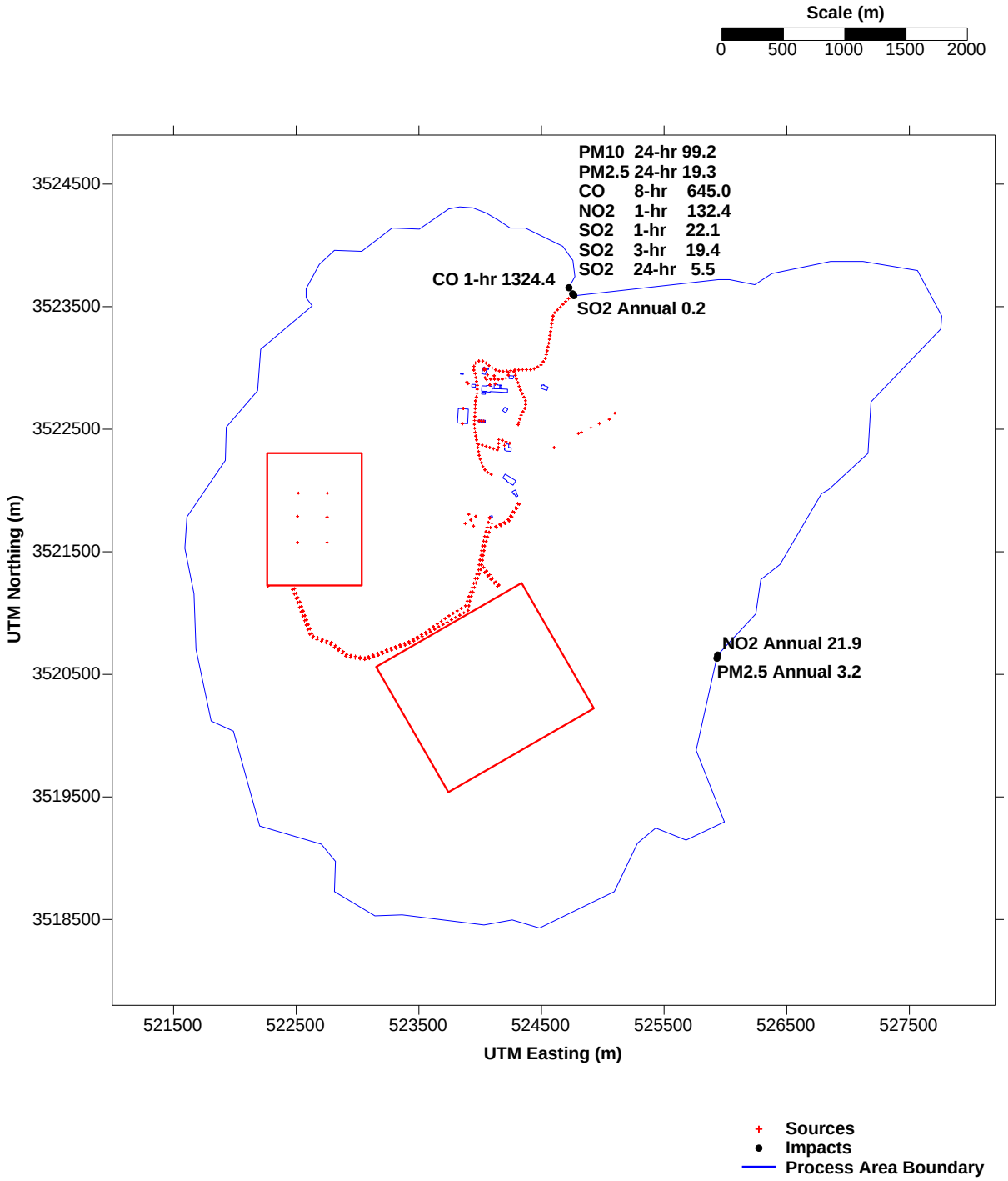


Figure 7.2 Receptor location of Modeled Impacts due to emissions for Year 5 (Concentrations are listed in units of µg/m^3)

APPENDIX A

PARTICLE SIZE DISTRIBUTIONS

A. PARTICLE SIZE DISTRIBUTIONS

The Dry Deposition option in AERMOD calculates the fraction of the particulate emissions in the plume that are removed by interaction with the ground surface or vegetation, thus providing a better estimate of the concentration of pollutants downwind from the source. The use of this option in AERMOD requires particle size distribution data in the form of the mass-mean particle diameter, mass weighted particle size distribution, and particle density. EPA modeling guidance does not specify any default values and this type of data is not readily available. The table below shows the particle size categories and the corresponding mass-mean particle diameters that will be used for modeling for the Rosemont project. The following sections describe the methodologies used to estimate the mass-mean particle diameter, particle density and mass weighted particle size distributions for various emission sources based on AP 42 emission factors.

A.1 Mass-Mean Particle Diameters

The expected mass mean particle diameter for particle size ranges between 0 and 10 microns in diameter was calculated using the formula below.

$$d = \left(\frac{{d_1}^3 + {d_1}^2 d_2 + d_1 {d_2}^2 + {d_2}^3}{4} \right)^{\frac{1}{3}}$$

where: d = mass-mean particle diameter
d_1 = low end of particle size category range
d_2 = high end of particle size category range

Table A.1 Mass-Mean Particle Diameters

Particle Size Category Range (microns)	Mass-Mean Particle Diameter (microns)
0 - 3.5	2.20
3.5 - 5	4.29
5 - 7	6.05
7 - 8.5	7.77
8.5 - 10	9.27

A.2 Particle Density

A particle density of 2.44 gm/cm^3 will be used for modeling. This value has previously been approved for use in similar modeling analyses by ADEQ, and is based on a weighted average of the densities of various rock materials (overburden, waste rock, ore) at copper mines.

A.3 Haul Road Sources - Particle Size Distribution

Section 13.2.2 of EPA's AP-42, *Compilation of Air Pollutant Emission Factors,* provides in Equation 1a a method to calculate emission factors for unpaved industrial roads. Based on a mean

haul truck weight of 305 tons and a silt content of 5% and using Equation 1a, the estimated emission factors for haul trucks at Rosemont were calculated. The emission factors were used to determine the distribution of emissions for particles with nominal diameters less than 30, 10 and 2.5 μm by calculating the percentage of PM_{30} emissions that can be attributed to PM_{10} and $PM_{2.5}$ emissions. The emission factors and distribution of PM_{30} emissions are presented in Table A.2.

$$E = k\left(\frac{s}{12}\right)^{a}\left(\frac{W}{3}\right)^{b} \qquad \text{Equation 1a}$$

where k, a, b, c and d are empirical constants and:

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)

Table A.2 Haul Road Emission Factors and Distribution of PM_{30} Emissions

Particle Size Diameter (microns)	Emission Factor (lb/VMT)[a]	Percentage of PM_{30} Emissions (%)
30	21.25	100.00
10	5.46	25.69
2.5	0.55	2.59

[a] Based on Equation 1a, AP-42 Section 13.2.2, and AP-42 Table 13.2.2-2

The percentage of PM_{30} emissions was plotted against the particle size diameter for each of the given particle sizes. A 2nd degree polynomial equation was used to fit the particle size diameter and percentage data as shown in Figure A.1.

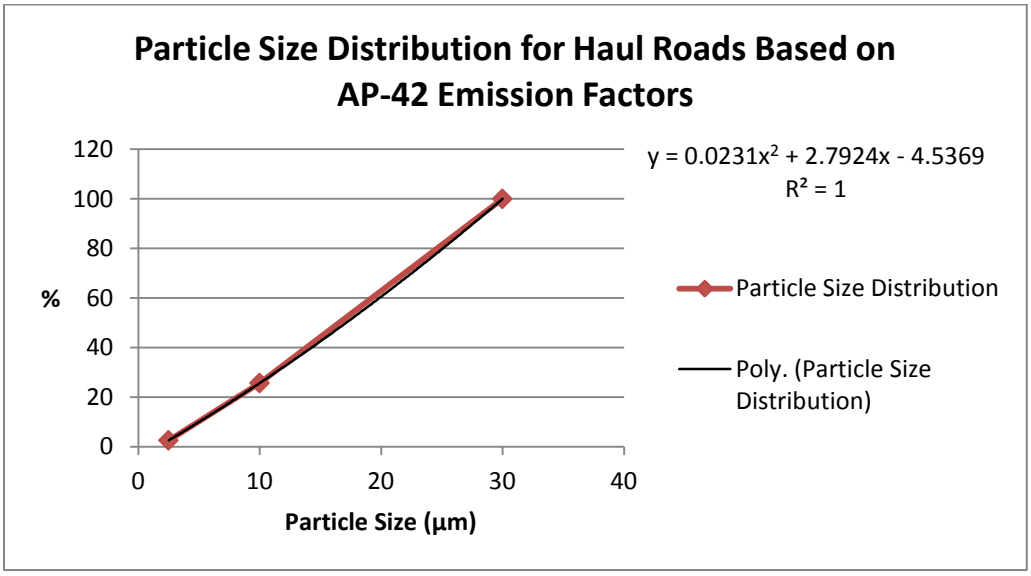


Figure A.1 Particle Size Distributions for Haul Roads Based on AP-42 Emission Factors

The percentage of particulates in each mass-mean particle diameter category described in Table A.1 was calculated based on the polynomial equation shown in Figure A.1. These percentages and the cumulative distribution of emissions between 0-10 microns was determined as shown in Table A.3.

Table A.3 Haul Road Cumulative Particle Size Distribution

Mass-Mean Particle Diameter (microns)	Percentage of PM_{30} Emissions (%)	Cumulative Distribution of Particle Sizes (%)
2.20	1.72	7.36
4.29	7.87	33.72
6.05	13.20	56.58
7.77	18.55	79.52
9.27	23.33	100.00

The particle size distribution for each particle size category range was then determined based on the 0 to 10 micron portion of the PM_{30} distribution. These particle size distribution percentages as shown in Table A.4 will be used in the modeling.

Table A.4 Particle Size Distribution - Haul Roads

Particle Size Category Range (microns)	Mass-Mean Particle Diameter (microns)	Particle Size Distribution (%)
0 - 3.5	2.20	7.36
3.5 - 5	4.29	26.35
5 - 7	6.05	22.86
7 - 8.5	7.77	22.94
8.5 - 10	9.27	20.48

A.4 Aggregate Handling - Particle Size Distribution

Section 13.2.4 of AP-42 lists equations to estimate emission factors for aggregate handling processes. The emission factors for different particle sizes are determined by the particle size multipliers that are given in Section 12.2.4.3 of AP-42. These particle size multipliers were used to determine the distribution of emissions for particles with nominal diameters less than 30, 10 and 2.5 μm by calculating the percentage of PM_{30} emissions that can be attributed to PM_{10} and $PM_{2.5}$ emissions. The aggregate handling particle size multipliers and the distribution of PM_{30} emissions are presented in Table A.5.

Table A.5 Aggregate Handling Particle Size Multipliers and Distribution of PM_{30} Emissions		
Particle Size Diameter (microns)	**Particle Size Multiplier**	**Percentage of PM_{30} Emissions (%)**
30	0.74	100.00
15	0.48	64.86
10	0.35	47.30
5	0.20	27.03
2.5	0.053	7.16

The percentage of PM_{30} emissions was plotted against the particle size diameter for each of the given particle sizes. A 2nd degree polynomial equation was used to fit the emission factor and percentage data as shown in Figure A.2.

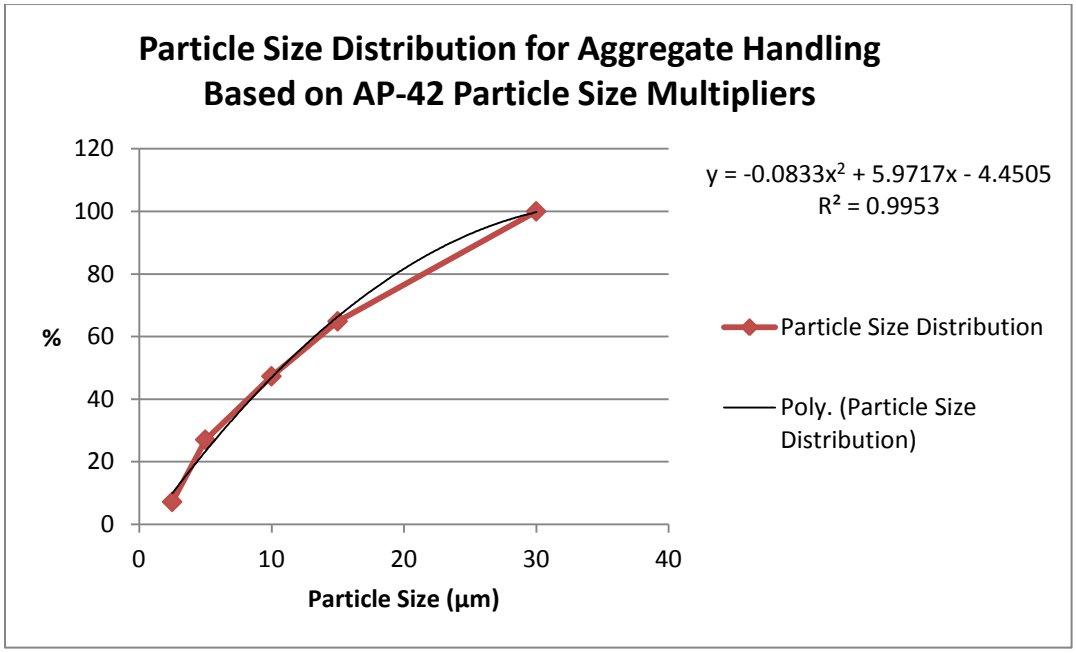


Figure A.2 Particle Size Distribution for Aggregate Handling Based on AP-42 Particle Size Multipliers

The percentage of particulates in each mass-mean particle diameter category described in Table A.1 was calculated based on the polynomial equation shown in Figure A.2. These percentages and the cumulative distribution of emissions between 0-10 microns was determined as shown in Table A.6.

Table A.6 Aggregate Handling Cumulative Particle Size Distribution		
Mass-Mean Particle Diameter (microns)	**Percentage of PM_{30} Emissions (%)**	**Cumulative Distribution of Particle Sizes (%)**
2.20	8.28	18.94
4.29	19.64	44.88
6.05	28.63	65.44
7.77	36.92	84.39
9.27	43.75	100.00

The particle size distribution for each particle size category range was then determined based on the 0 to 10 micron portion of the PM_{30} distribution. These particle size distribution percentages as shown in Table A.7 will be used in the modeling.

Table A.7 Particle Size Distribution – Aggregate Handling		
Particle Size Category Range (microns)	**Mass-Mean Particle Diameter (microns)**	**Particle Size Distribution (%)**
0 - 3.5	2.20	18.94
3.5 - 5	4.29	25.95
5 - 7	6.05	20.56
7 - 8.5	7.77	18.95
8.5 - 10	9.27	15.61

A.5 Blasting - Particle Size Distribution

AP-42 Table 11.9-1 lists a predictive equation for estimating the PM_{30} emission factor for blasting based on the western surface coal mining process. This table also lists scaling factors used to multiply with the predictive equation to estimate emission factors for other particle sizes. The scaling factors for blasting were used to determine the distribution of emissions for particles with nominal diameters less than 30, 10 and 2.5 μm by calculating the percentage of PM_{30} emissions that can be attributed to PM_{10} and $PM_{2.5}$ emissions. The scaling factors and distribution of PM_{30} emissions are presented in Table A.8.

Table A.8 Blasting Scaling Factors and Distribution of PM_{30} Emissions		
Particle Size Diameter (microns)	**Scaling Factor**	**Percentage of PM_{30} Emissions (%)**
30	1	100
10	0.52	52
2.5	0.03	3

[a] Predictive equation = 0.000014(A)^(1.5) ; A = Area of blast

The percentage of PM_{30} emissions was plotted against the particle size diameter for each of the given particle sizes. A 2nd degree polynomial equation was used to fit the emission factor and percentage data as shown in Figure A.3.

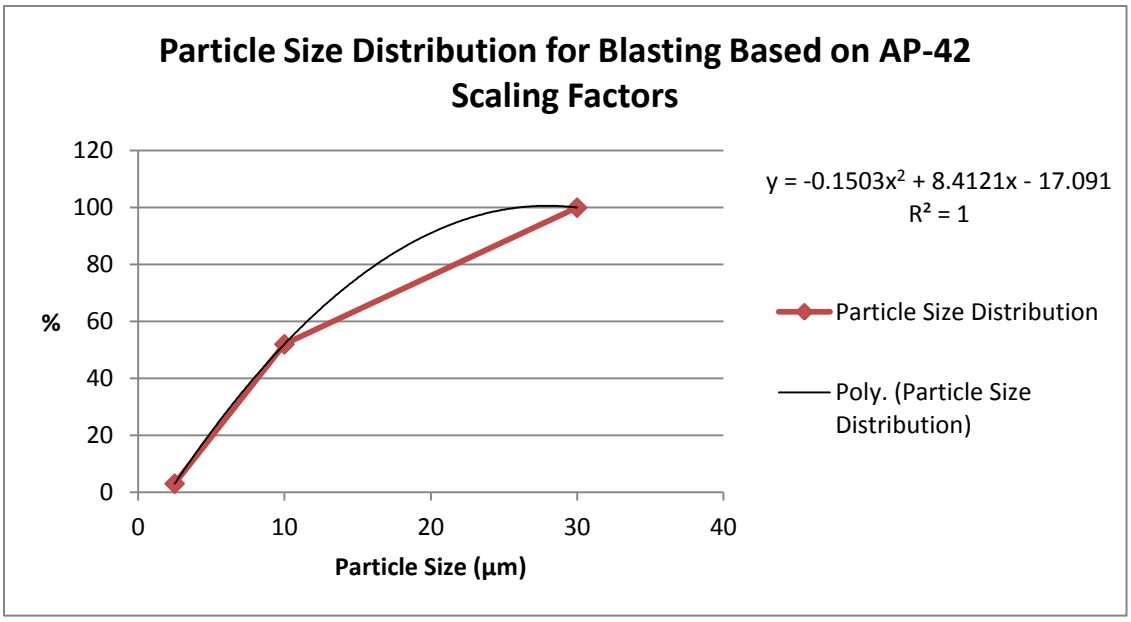


Figure A.3 Particle Size Distribution for Blasting Based on AP-42 Scaling Factors

The percentage of particulates in each mass-mean particle diameter category described in Table A.1 was calculated based on the polynomial equation shown in Figure A.3. These percentages and the cumulative distribution of emissions between 0-10 microns was determined as shown in Table A.9.

Table A.9 Blasting Cumulative Particle Size Distribution

Mass-Mean Particle Diameter (microns)	Percentage of PM_{30} Emissions (%)	Cumulative Distribution of Particle Sizes (%)
2.20	0.69	1.43
4.29	16.23	33.83
6.05	28.30	58.99
7.77	39.20	81.71
9.27	47.97	100.00

The particle size distribution for each particle size category range was then determined based on the 0 to 10 micron portion of the PM_{30} distribution. These particle size distribution percentages as shown in Table A.10 will be used in the modeling.

Table A.10 Particle Size Distribution - Blasting		
Particle Size Category Range (microns)	**Mass-Mean Particle Diameter (microns)**	**Particle Size Distribution (%)**
0 - 3.5	2.20	1.43
3.5 - 5	4.29	32.40
5 - 7	6.05	25.16
7 - 8.5	7.77	22.71
8.5 - 10	9.27	18.29

A.6 Point Sources - Particle Size Distribution

Page B.2-6, Appendix B.2 of AP-42 lists the collection efficiency of fabric filters used in baghouses for various particle sizes. These collection efficiencies were used along with emission factors for aggregate handling processes (Section 13.2.4 of AP-42) to calculate particle size distributions. The aggregate handling process emission factors for various particle sizes depend upon the particle size multiplier. These particle size multipliers were used to determine the distribution of emissions for particles with nominal diameters less than 30, 15, 10, 5 and 2.5 μm by calculating the percentage of PM_{30} emissions that can be attributed to PM_{10} and $PM_{2.5}$ emissions. The scaling factors and distribution of PM_{30} emissions are presented in Table A.11.

Table A.11 Point Source Emission Factors and Distribution of PM_{30} Emissions		
Particle Size Diameter (microns)	**Emission Factor (lb/VMT)[a]**	**Percentage of PM_{30} Emissions (%)**
30	0.74	100.00
15	0.48	64.86
10	0.35	47.30
5	0.20	27.03
2.5	0.053	7.16

The percentage of PM_{30} emissions was plotted against the particle size diameter for each of the given particle sizes. A 2nd degree polynomial equation was used to fit the emission factor and percentage data as shown in Figure A.4.

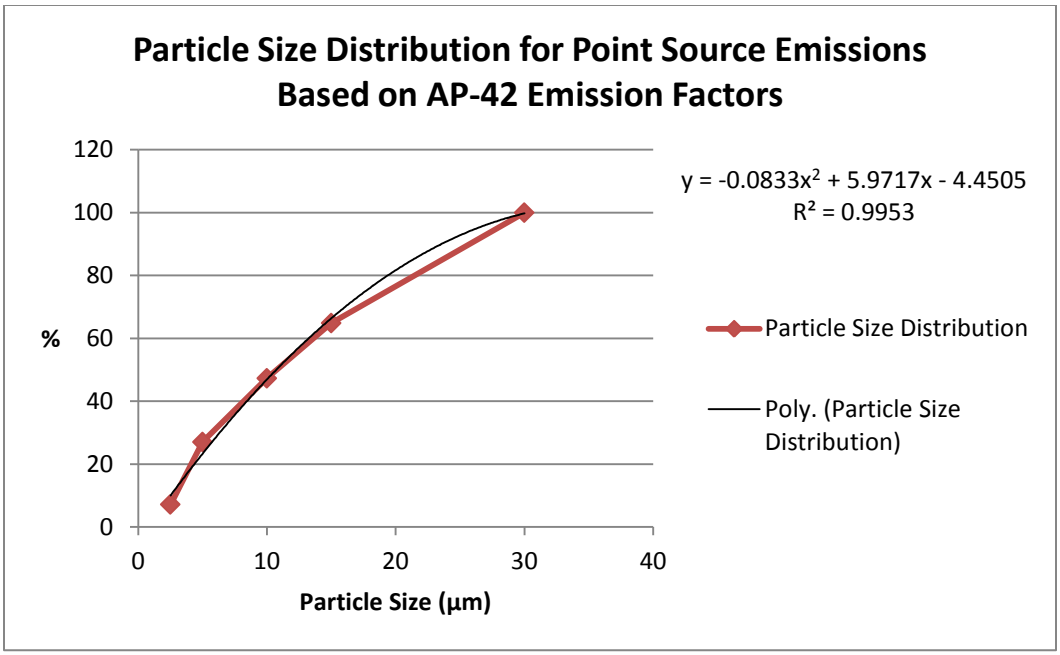


Figure A.4 Particle Size Distribution for Point Source Emissions Based on AP-42 Emission Factors

The percentage of particulates in each mass-mean particle diameter category described in Table A.1 was calculated based on the polynomial equation shown in Figure A.4. These percentages and the cumulative distribution of emissions between 0-10 microns was determined as shown in Table A.12.

Table A.12 Point Source Cumulative Particle Size Distribution

Mass-Mean Particle Diameter (microns)	Percentage of PM_{30} Emissions (%)	Cumulative Distribution of Particle Sizes (%)
2.20	8.28	18.94
4.29	19.64	44.88
6.05	28.63	65.44
7.77	36.92	84.39
9.27	43.75	100.00

The particle size distribution for each particle size category range was then determined based on the 0 to 10 micron portion of the PM_{30} distribution and adjusted based on fabric filter collection efficiencies of 99% for the 2.5 micron fraction and 99.5% for the remaining size fractions. These particle size distribution percentages as shown in Table A.13 will be used in the modeling.

Table A.13 Particle Size Distribution - Point Sources		
Particle Size Category Range (microns)	**Mass-Mean Particle Diameter (microns)**	**Particle Size Distribution (%)**
0 - 3.5[a]	2.20	31.84
3.5 - 5[b]	4.29	21.81
5 - 7[b]	6.05	17.29
7 - 8.5[b]	7.77	15.93
8.5 - 10[b]	9.27	13.12

[a] 99% collection efficiency for fabric filter dust collectors used.

[b] 99.5% collection efficiency for fabric filter dust collectors used.

A.7 Paved Road Sources - Particle Size Distribution

Section 13.2.1 of AP 42 lists equations to estimate emission factors for Paved Roads. The emission factors for different particle sizes are determined by the particle size multipliers that are given in Section 13.2.1 of AP42. These particle size multipliers were used to determine the distribution of emissions for particles with nominal diameters less than 30, 15, 10, 5 and 2.5 μm by calculating the percentage of PM_{30} emissions that can be attributed to PM_{10} and $PM_{2.5}$ emissions. The paved road particle size multipliers and the distribution of PM_{30} emissions are presented in Table A.14.

Table A.14 Paved Road Emission Factors		
Particle Size Diameter (microns)	**Particle Size Multiplier[a]**	**Percentage Distribution (%)**
30	0.011	100.00
15	0.0027	24.55
10	0.0022	20.00
2.5	0.00054	4.91

[a] AP42 Section 13.2.1 Table 13.2.1-1. Used in equation 1 of AP42 Section 13.2.1.3

The percentage of PM_{30} emissions was plotted against the particle size diameters for each of the given particle sizes. A 2nd degree polynomial equation was used to fit the particle size diameter and percentage data as shown in Figure A.5..

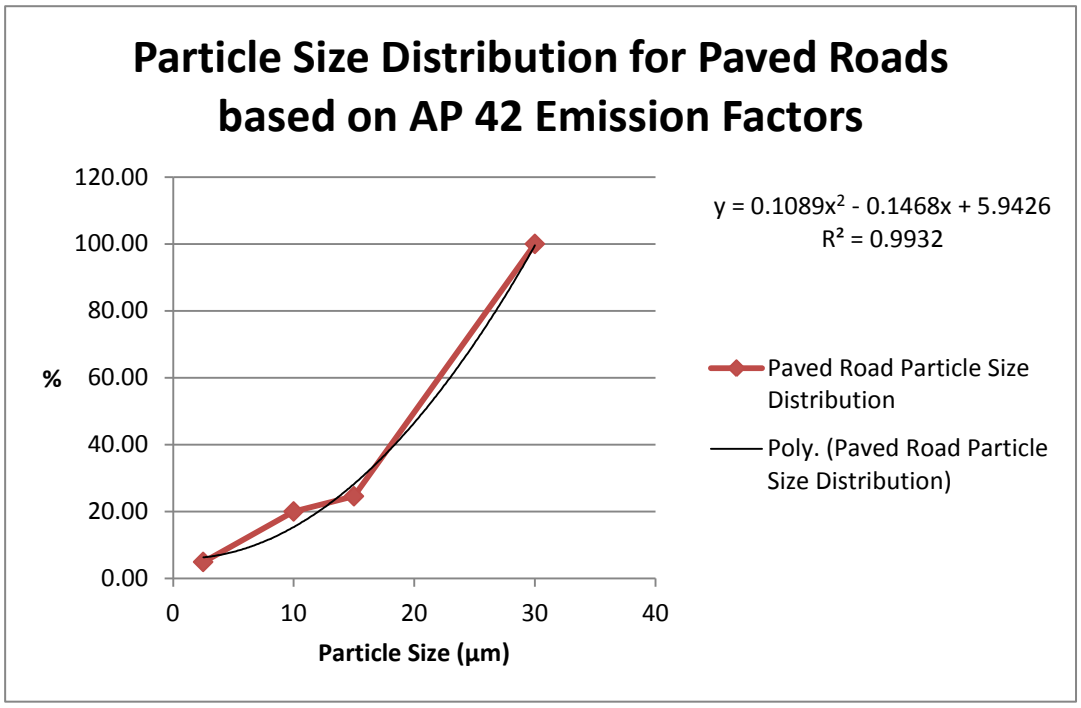


Figure A.5 Particle Size Distribution - Paved Road Source Emissions based on AP 42 Emission Factors

The percentage of particulates in each mass-mean particle diameter category described in Table A.1 was calculated based on the polynomial equation shown in Figure A.5. These percentages and the cumulative distribution of emissions between 0-10 microns was determined as shown in Table A.15.

Table A.15 Paved Roads Cumulative Particle Size Distribution

Mass-Mean Particle Diameter (microns)	Percentage of PM_{30} Emissions (%)	Cumulative Distribution of Particle Sizes (%)
2.20	6.15	44.09
4.29	7.32	52.49
6.05	9.04	64.85
7.77	11.38	81.61
9.27	13.94	100.00

The particle size distribution for each particle size category range was determined based on the 0 to 10 microns portion of the PM_{30} distribution. These particle size distribution percentages as shown in Table A.16 will be used in the modeling.

Table A.16 Particle Size Distribution - Paved Road Sources		
Particle Size Category Range (microns)	**Mass-Mean Particle Diameter (microns)**	**Particle Size Distribution (%)**
0 - 3.5[a]	2.20	44.09
3.5 - 5[b]	4.29	8.40
5 - 7[b]	6.05	12.36
7 - 8.5[b]	7.77	16.76
8.5 - 10[b]	9.27	18.39

APPENDIX B

QUARTERLY PM_{10} MONITORING SUMMARIES

Table B.1 Summary of 24-Hour PM_{10} Concentrations ($\mu g/m^3$) July 2006-June 2007					
Time Period	**Valid Samples**	**Arithmetic Mean**	**Highest**	**2nd Highest**	**3rd Highest**
3rd Quarter 06	13	24.6	71.3	27.0	26.8
4th Quarter 06	14	8.3	18.7	17.7	10.6
1st Quarter 07	15	2.3	7.0	5.5	4.6
2nd Quarter 07	15	17.6	28.7	27.0	25.6
Average	14.25	13.2	N/A	N/A	N/A
Highest Overall	N/A	N/A	71.3	27.0	26.8

Table B.2 Summary of 24-Hour PM_{10} Concentrations ($\mu g/m^3$) July 2007-June 2008					
Time Period	**Valid Samples**	**Arithmetic Mean**	**Highest**	**2nd Highest**	**3rd Highest**
3rd Quarter 07	13	19.2	40.3	21.7	20.8
4th Quarter 07	15	5.3	11.9	11.9	8.0
1st Quarter 08	16	4.1	13.5	9.6	7.7
2nd Quarter 08	15	19.5	32.6	28.2	25.2
Average	14.75	12.02	N/A	N/A	N/A
Highest Overall	N/A	N/A	40.3	28.2	25.2

Table B.3 Summary of 24-Hour PM_{10} Concentrations ($\mu g/m^3$) July 2008-June 2009					
Time Period	**Valid Samples**	**Arithmetic Mean**	**Highest**	**2nd Highest**	**3rd Highest**
3rd Quarter 08	14	15.3	24.5	21.2	20.0
4th Quarter 08	15	8.5	31.6	15.1	12.7
1st Quarter 09	15	8.0	17.9	17.8	17.6
2nd Quarter 09	16	10.0	15.4	12.9	12.9
Average	15	10.45	N/A	N/A	N/A
Highest Overall	N/A	N/A	31.6	21.2	20.0

Table B.4 Summary of Annual PM_{10} Concentrations ($\mu g/m^3$)					
Time Period	**Valid Samples**	**Arithmetic Mean**	**Highest**	**2nd Highest**	**3rd Highest**
July 2006-June 2007	14.25	13.2	71.3	27.0	26.8
July 2007- June 2008	14.8	12.0	40.3	28.2	25.2
July 2008- June 2009	15	10.45	31.6	21.2	20.0
Average	14.7	11.9	N/A	N/A	N/A
Highest Overall	N/A	N/A	71.3	28.2	26.8

APPENDIX C

STATISTICAL EVALUATION OF AMBIENT PM_{10} MEASUREMENTS

C.1 INTRODUCTION AND BACKGROUND INFORMATION

Ambient monitoring at the Rosemont site for PM_{10} concentrations was performed and recorded from June 16, 2006 to June 30, 2009. The PM_{10} concentration measurements, as a function of the date they were recorded (time series plot) are presented in Figure C.1. Within this data, there are two concentration measurements that appear to be outlying data. These data points are indicated in red in Figure C.1.

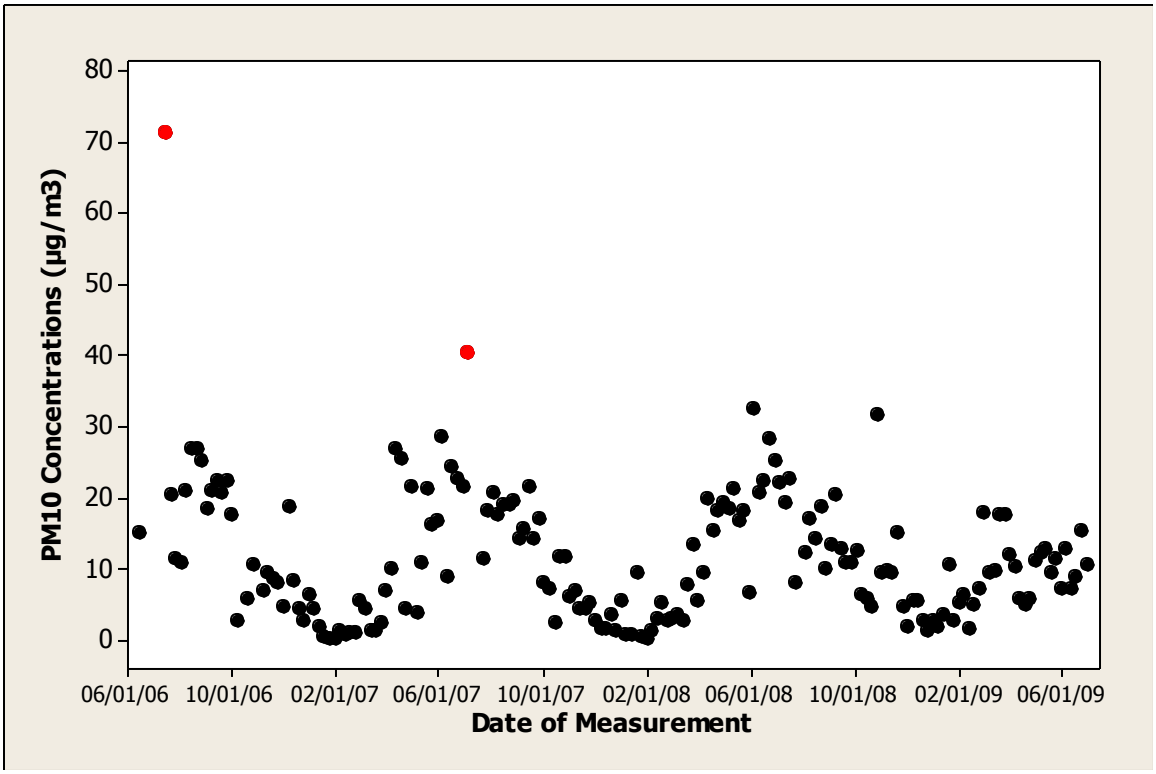


Figure C.1 PM10 Concentration Measurements

The remainder of this appendix will statistically analyze these two data points to determine:

- If each data point can statistically be labeled as an outlier; and
- What the probability is of a future occurrence greater than or equal to each data point.

The results of the above analyses will determine if the data points can statistically be eliminated during further PM_{10} concentration data analysis. All graphs and statistical data presented in this appendix have been generated using Minitab. The Minitab output is presented in Appendix C1.

C.2 OUTLIER ANALYSIS

C.2.1 ANALYSIS

An **outlier** is defined as a data point:

1. Greater than 1.5 interquartile ranges but less than 3 interquartile ranges from the third quartile value; or

2. Less than 1.5 interquartile ranges but more than 3 interquartile ranges from the first quartile value.

Additionally, an **extreme outlier** is defined as a data point:

A. Greater than 3 interquartile ranges from the third quartile value; or
B. Less than 3 interquartile ranges from the first quartile value.

These are widely accepted definitions and can be found in any statistics textbook. For reference, the definitions can be located on page 33 of the Third Edition of *Engineering Statistics* (Montgomery, Runger, Hubele).

As shown in Figure C.1, the data points being analyzed are greater than the remaining PM_{10} concentration measurements. Therefore, only Definition 1 for an outlier and Definition A for extreme outlier will be considered further in this analysis.

The statistical data for the PM_{10} concentration measurements are presented and defined in Table C.1. This information is also graphically shown in the box plot presented in Figure C.2.

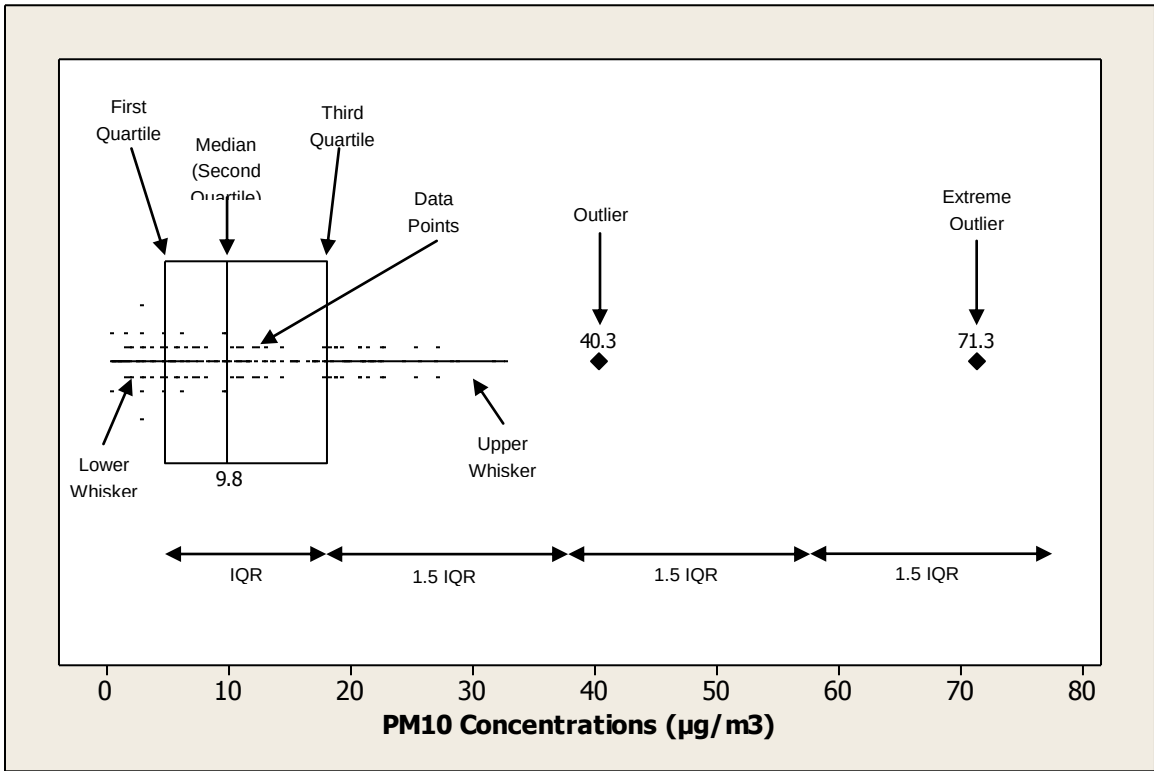


Figure C.2 Box Plot for PM_{10} Concentration Measurements

As shown in Table C.1 and Figure C.2, the 40.3 µg/m^3 data point meets the definition of an outlier while the 71.3 µg/m^3 data point meets the definition of extreme outlier. The 71.3 µg/m^3 data point is within four interquartile ranges from the third quartile value.

Table C.1 Statistical Data for the PM_{10} Concentration Measurements		
Statistical Data	Definition	Value for the PM_{10} Concentration Measurements
Minimum Value	The smallest observation in the data set.	0.30 µg/m^3
First Quartile Value	The value that has 25% of the data points less than it and 75% of the data points greater than it.	4.65 µg/m^3
Median (Second Quartile) Value	The value that has 50% of the data points less than it and 50% of the data points greater than it.	9.80 µg/m^3
Mean	The location or central tendency of the data points.	11.625 µg/m^3
Third Quartile Value	The value that has 75% of the data points less than it and 25% of the data points greater than it.	18.05 µg/m^3
Maximum Value	The largest observation in the data set.	71.30 µg/m^3
Interquartile Range (IQR)	The difference between the third and first quartile values.	13.40 µg/m^3
Lower Whisker Endpoint	The smallest data point within 1.5 interquartile ranges from the first quartile value.	0.30 µg/m^3
Upper Whisker Endpoint	The largest data point within 1.5 interquartile ranges from the third quartile value.	32.60 µg/m^3
3rd Quartile Value + 1.5 IQR	The third quartile value plus 1.5 times the interquartile range.	38.15 µg/m^3
3rd Quartile Value + 3 IQR	The third quartile value plus 3 times the interquartile range.	58.25 µg/m^3
3rd Quartile Value + 4 IQR	The third quartile value plus 4 times the interquartile range.	71.65 µg/m^3

C.2.2 CONCLUSION BASED ON OUTLIER ANALYSIS

The high value of the extreme outlier (71.3 µg/m^3) compared to the other PM_{10} concentration measurements recorded during the monitoring program (median value of 9.80 µg/m^3) indicates that a highly unusual event or some error occurred during the measurement or processing of the data (e.g. recording of an incorrect filter weight). Consequently, it is unrealistic to include this data point in further PM_{10} concentration data analysis.

Instead, the 71.3 µg/m^3 data point will be replaced by a value equivalent to the outlier data point (40.3 µg/m^3). Although the 40.3 µg/m3 data point is a statistical outlier, it is within 2.15 µg/m^3 of being considered a non-outlier data point. Therefore, retaining the 40.3 µg/m^3 data point in future PM_{10} concentration data analysis and replacing the 71.3 µg/m^3 data point with 40.3 µg/m^3 is a conservative method used to approximate realistic high concentration measurements for the Rosemont project.

C.3 PROBABILITY ANALYSIS

C.3.1 DETERMINATION OF DISTRIBUTION

In order to determine the probability of occurrence of future PM_{10} concentration measurements, the statistical distribution of the data set needs to be determined. Probability plots are commonly used to evaluate the fit of a statistical distribution to a data set. They use a scale specific to a certain type of statistical distribution and plot the ordered data points against the percentage of data points in the data set that are less than or equal to the data points. If the plotted points approximately form a straight line, the data set can be assumed to follow the specified distribution.

Probability plots for the PM_{10} concentration measurements were made in Minitab for 14 different types of statistical distributions. These probability plots are presented with the Minitab output in Appendix C1. As shown in Appendix C1, two probability plots were made for each type of distribution including:

1) All PM_{10} concentration measurement data points; and

2) All PM_{10} concentration measurement data points excluding 71.3 µg/m^3, which was replaced by 40.3 µg/m^3 as suggested in Section C.2.2.

For each probability plot, Minitab records the Anderson-Darling (AD) statistic, which is used to measure how well the statistical distribution fits the data set. For a given data set, the better the statistical distribution fits the data, the smaller the AD statistic will be.

The AD statistics for each probability plot associated with the PM_{10} concentration measurements are presented in Table C.2. As shown in Table C.2, the Weibull distribution has the lowest AD statistic when including all PM_{10} concentration measurements (from now on referred to as the CM data set). Although the AD statistic increases slightly when replacing the 71.3 µg/m^3 data point with 40.3 µg/m^3 (from now on referred to as CM* data set), the Weibull distribution still results in the lowest AD statistic. Therefore, it is assumed that the CM and CM* data sets have a Weibull distribution. The following probability analysis will be based on a Weibull distribution.

Table C.2 Anderson-Darling Statistic for Statistical Distributions of the PM_{10} Concentration Measurements		
Type of Distribution	Anderson-Darling Statistic	
	CM - All PM_{10} Concentration Measurements (µg/m3)	CM* - All PM_{10} Concentration Measurements (µg/m3) Except with 71.3 Replaced by 40.3
Normal	3.285	2.989
Lognormal	3.744	3.870
3-Parameter Lognormal	1.471	1.524
Exponential	3.280	3.586
2-Parameter Exponential	2.727	3.014
Smallest Extreme Value	16.867	6.735
Weibull	**0.796**	**0.955**
3-Parameter Weibull	1.012	1.066
Largest Extreme Value	1.643	1.761
Logistic	2.809	2.906
Loglogistic	2.742	2.832
3-Parameter Loglogistic	1.824	1.864
Gamma	1.082	1.224
3-Parameter Gamma	1.144	1.261

C.3.2 PROBABILITY ANALYSIS

Since the CM and CM* data sets have been determined to have a Weibull distribution, the following Weibull probability density and cumulative distribution functions can be utilized:

$$f(x)=\left(\frac{\beta}{\delta}\right)\left(\frac{x}{\delta}\right)^{\beta-1}\exp\left[-\left(\frac{x}{\delta}\right)^{\beta}\right], \text{ for } x > 0, \beta > 0, \delta > 0$$ Weibull Probability Density Function

$$F(x)=1-\exp\left[-\left(\frac{x}{\delta}\right)^{\beta}\right]$$ Weibull Cumulative Distribution Function

where:

x = Weibull random variable;
β = shape parameter
δ = scale parameter

The probability density function, f(x), produces the probability of a data point, x, occurring in a future sample. The cumulative distribution function, F(x), produces the probability of a future sample being equal to or less than the specified data point, x. The probability of a future sample being greater than a specified data point, x, can be determined by subtracting the value found using the cumulative distribution function from 100% probability (1-F(x)). Furthermore, the number of samples expected to occur before obtaining a sample greater than a specified data point, x, can be determined by taking the multiplicative inverse (reciprocal) of 1-F(x).

The output of the Weibull probability density function for the CM and CM* data sets are presented in Figure C.3. The output of the Weibull cumulative distribution function for the CM and CM* data sets are presented in Figure C.4. The CM data set has a shape parameter of 1.258 and a scale parameter of 12.48 while the CM* data set has a shape parameter of 1.311 and a scale parameter of 12.38. The shape and scale parameters were determined by Minitab and are shown in the Minitab output in Appendix C1.

The specific numerical output of the probability density function and the cumulative distribution function for PM_{10} concentrations 40.3 µg/m^3 and 71.3 µg/m^3 are presented in Table C.3. The probabilities of a future sample being greater than 40.3 µg/m^3 and 71.3 µg/m^3 are also presented in Table C.3. Additionally, Table C.3 presents the number of samples expected to occur before obtaining a sample greater than 40.3 µg/m^3 and 71.3 µg/m^3.

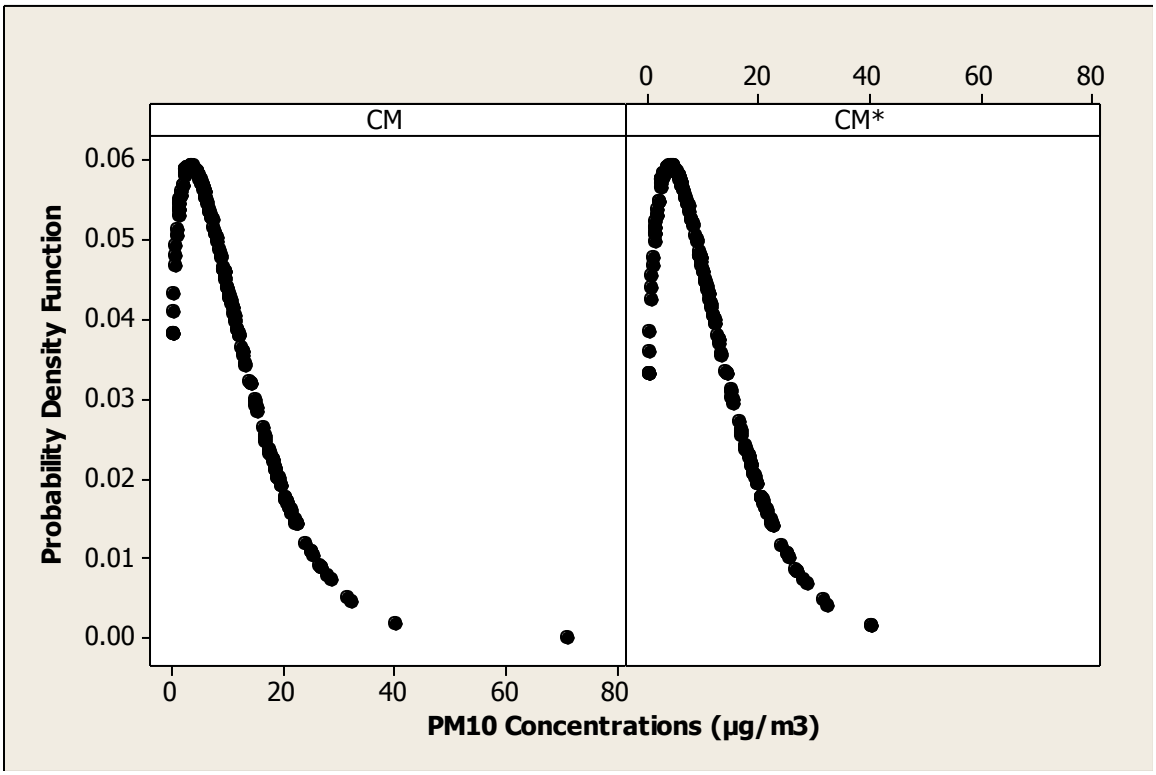


Figure C.3 Weibull Probability Density for PM_{10} Concentration Measurements

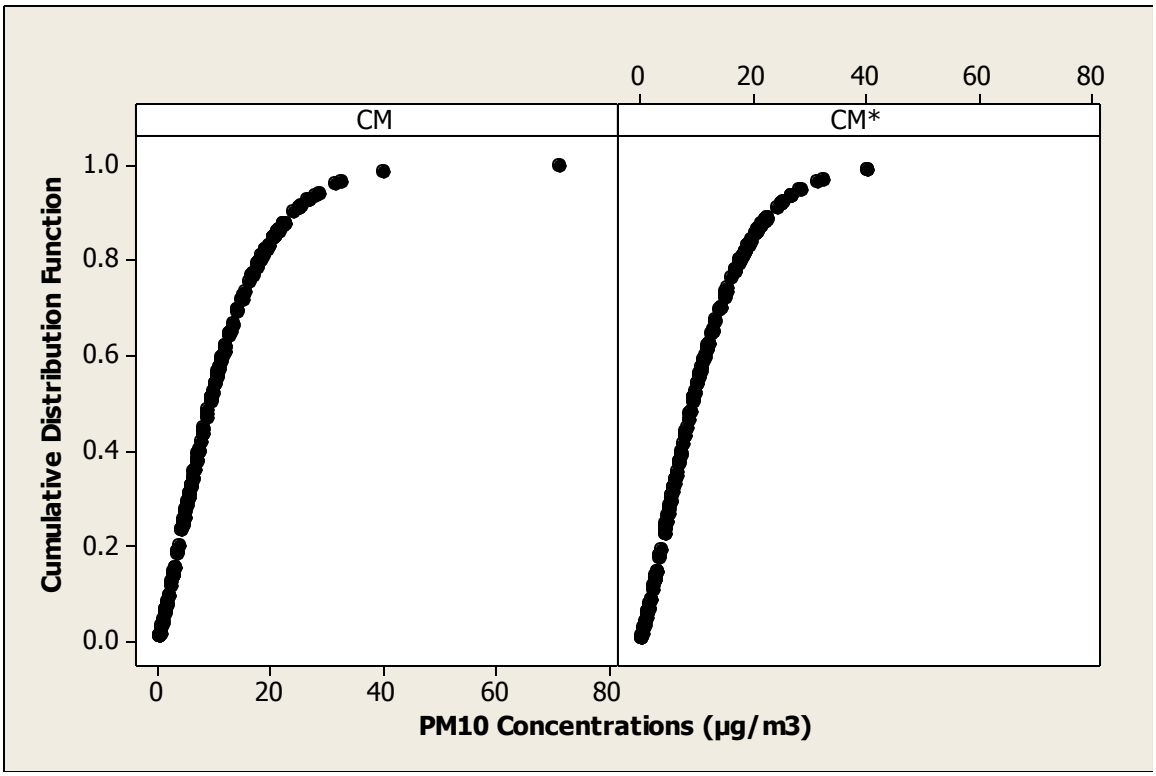


Figure C.4 Weibull Cumulative Distribution for PM_{10} Concentration Measurements

Table C.3 Probability Data for the PM_{10} Concentration Measurements

Probability/Expected Value	CM Data Set		CM* Data Set	
	40.3 µg/m^3	71.3 µg/m^3	40.3 µg/m^3	71.3 µg/m^3
Probability of a Data Point Occurring in a Future Sample (Weibull Probability Density Function, f(x))	0.002	0.00002	0.001	0.000009
Probability of a Future Sample Being Equal to or Less than the Data Point (Weibull Cumulative Distribution Function, F(x))	0.987	0.9999	0.991	0.99995
Probability of a Future Sample Being Greater than the Data Point (1-F(x))	0.013	0.0001	0.009	0.00005
Number of Samples Expected to Occur Before Obtaining a Sample Greater than the Data Point (1/(1-F(x)))	79	7,760	110	20,488

C.3.3 CONCLUSION BASED ON PROBABILITY ANALYSIS

As shown in Table C.3, the probability of a future PM_{10} concentration measurement being greater than 71.3 µg/m^3 is extremely low, regardless of if the 71.3 µg/m^3 data point is included or replaced by 40.3 µg/m^3 in the data set being analyzed (0.01% and 0.005% probability, respectively). Furthermore, for a sampling plan that obtains a PM_{10} concentration measurement once every six days (identical to the sampling plan used to obtain the data analyzed in this appendix), it would be expected to see a PM_{10} concentration measurement greater than 71.3 µg/m^3 approximately once every 127 or 336 years, using the CM or CM* data sets, respectively. Therefore, combining the extreme outlier determination with the low probability of reoccurrence, it is determined to be unrealistic to use the 71.3 µg/m^3 data point in future PM_{10} concentration data analysis.

Since the probability of a future PM_{10} concentration measurement being greater than the 40.3 µg/m^3 is approximately 1% and this future measurement is expected to occur during the life of the RCP (using a once every six day sampling plan), the 40.3 µg/m^3 data point should be included in future PM_{10} concentration data analysis.

APPENDIX C.1

MINITAB OUTPUT

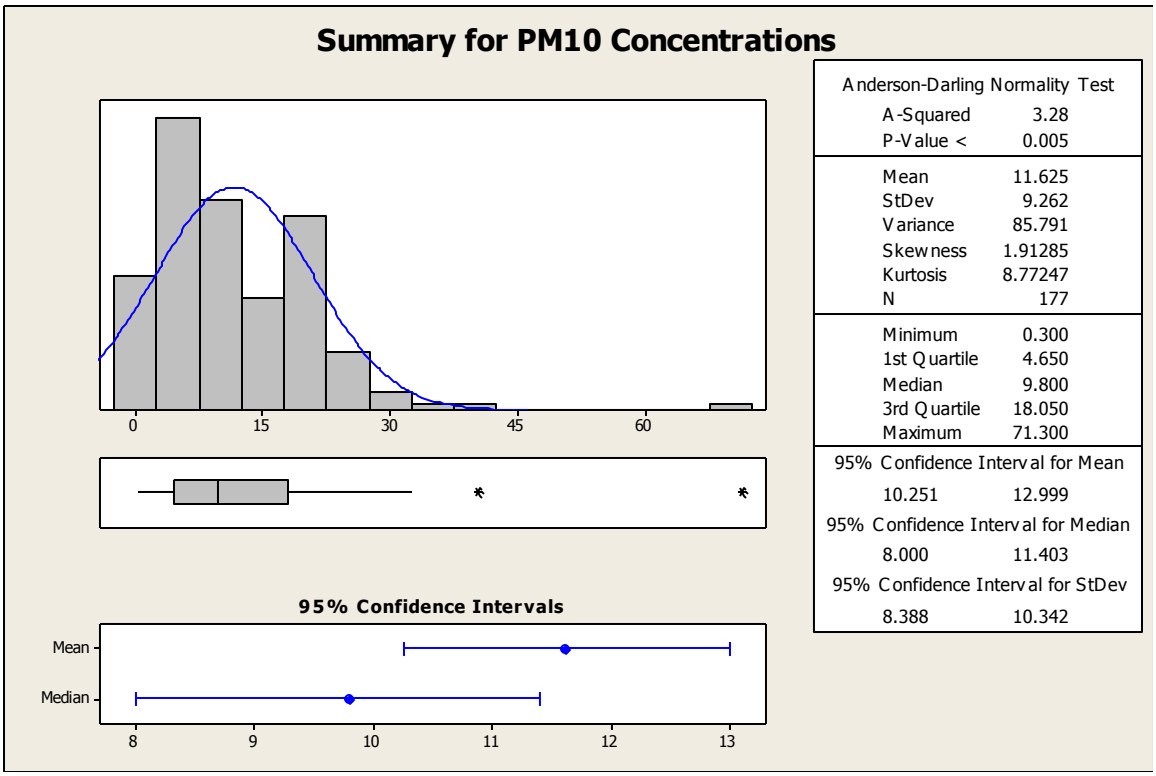
Data Display

Row	Date	PM10 Concentrations
1	06/16/06	15.0
2	07/16/06	71.3
3	07/22/06	20.6
4	07/28/06	11.5
5	08/03/06	10.8
6	08/09/06	21.0
7	08/15/06	27.0
8	08/21/06	26.8
9	08/27/06	25.2
10	09/02/06	18.6
11	09/08/06	20.9
12	09/14/06	22.4
13	09/20/06	20.7
14	09/26/06	22.4
15	10/02/06	17.7
16	10/08/06	2.7
17	10/20/06	6.0
18	10/26/06	10.6
19	11/07/06	7.0
20	11/13/06	9.5
21	11/19/06	8.7
22	11/25/06	8.2
23	12/01/06	4.7
24	12/07/06	18.7
25	12/13/06	8.3
26	12/19/06	4.6
27	12/25/06	2.8
28	12/31/06	6.3
29	01/06/07	4.4
30	01/12/07	2.0
31	01/18/07	0.5
32	01/24/07	0.3
33	01/30/07	0.3
34	02/05/07	1.5
35	02/11/07	0.9
36	02/17/07	1.1
37	02/23/07	1.0
38	03/01/07	5.5
39	03/07/07	4.6
40	03/13/07	1.4
41	03/19/07	1.5
42	03/25/07	2.5
43	03/31/07	7.0
44	04/06/07	10.2
45	04/12/07	27.0
46	04/18/07	25.6

47	04/24/07	4.4
48	04/30/07	21.6
49	05/06/07	3.8
50	05/12/07	10.9
51	05/18/07	21.3
52	05/24/07	16.4
53	05/30/07	16.9
54	06/05/07	28.7
55	06/11/07	9.0
56	06/17/07	24.3
57	06/23/07	22.6
58	06/29/07	21.5
59	07/05/07	40.3
60	07/23/07	11.6
61	07/29/07	18.3
62	08/04/07	20.8
63	08/10/07	17.7
64	08/16/07	19.2
65	08/22/07	19.2
66	08/28/07	19.7
67	09/03/07	14.3
68	09/09/07	15.6
69	09/15/07	21.7
70	09/21/07	14.2
71	09/27/07	17.1
72	10/03/07	8.0
73	10/09/07	7.4
74	10/15/07	2.4
75	10/21/07	11.9
76	10/27/07	11.9
77	11/02/07	6.2
78	11/08/07	6.9
79	11/14/07	4.5
80	11/20/07	4.6
81	11/26/07	5.4
82	12/02/07	2.7
83	12/08/07	1.7
84	12/14/07	1.7
85	12/20/07	3.5
86	12/26/07	1.4
87	01/01/08	5.6
88	01/07/08	0.7
89	01/13/08	0.8
90	01/19/08	9.6
91	01/25/08	0.4
92	01/31/08	0.3
93	02/06/08	1.3
94	02/12/08	3.0
95	02/18/08	5.3
96	02/24/08	2.8
97	03/01/08	3.0

98	03/07/08	3.6
99	03/13/08	2.7
100	03/19/08	7.7
101	03/25/08	13.5
102	03/31/08	5.5
103	04/06/08	9.5
104	04/12/08	19.8
105	04/18/08	15.3
106	04/24/08	18.2
107	04/30/08	19.4
108	05/06/08	18.6
109	05/12/08	21.3
110	05/18/08	16.8
111	05/24/08	18.2
112	05/30/08	6.6
113	06/05/08	32.6
114	06/11/08	20.7
115	06/17/08	22.5
116	06/23/08	28.2
117	06/29/08	25.2
118	07/05/08	22.2
119	07/11/08	19.3
120	07/17/08	22.6
121	07/23/08	8.0
122	08/04/08	12.2
123	08/10/08	17.0
124	08/16/08	14.3
125	08/22/08	18.7
126	08/28/08	10.2
127	09/03/08	13.4
128	09/09/08	20.6
129	09/15/08	13.0
130	09/21/08	11.0
131	09/27/08	11.0
132	10/03/08	12.7
133	10/09/08	6.3
134	10/15/08	5.9
135	10/21/08	4.8
136	10/27/08	31.6
137	11/02/08	9.6
138	11/08/08	9.9
139	11/14/08	9.4
140	11/20/08	15.1
141	11/26/08	4.8
142	12/02/08	2.0
143	12/08/08	5.7
144	12/14/08	5.7
145	12/20/08	2.7
146	12/26/08	1.4
147	01/01/09	2.7
148	01/07/09	1.8

149	01/13/09	3.6
150	01/19/09	10.7
151	01/25/09	2.9
152	01/31/09	5.2
153	02/06/09	6.5
154	02/12/09	1.6
155	02/18/09	5.0
156	02/24/09	7.3
157	03/02/09	17.9
158	03/08/09	9.5
159	03/14/09	9.8
160	03/20/09	17.6
161	03/26/09	17.8
162	04/01/09	12.1
163	04/07/09	10.5
164	04/13/09	6.0
165	04/19/09	5.1
166	04/25/09	6.0
167	05/01/09	11.3
168	05/07/09	12.2
169	05/13/09	12.9
170	05/19/09	9.6
171	05/25/09	11.4
172	05/31/09	7.2
173	06/06/09	12.9
174	06/12/09	7.3
175	06/18/09	8.9
176	06/24/09	15.4
177	06/30/09	10.6



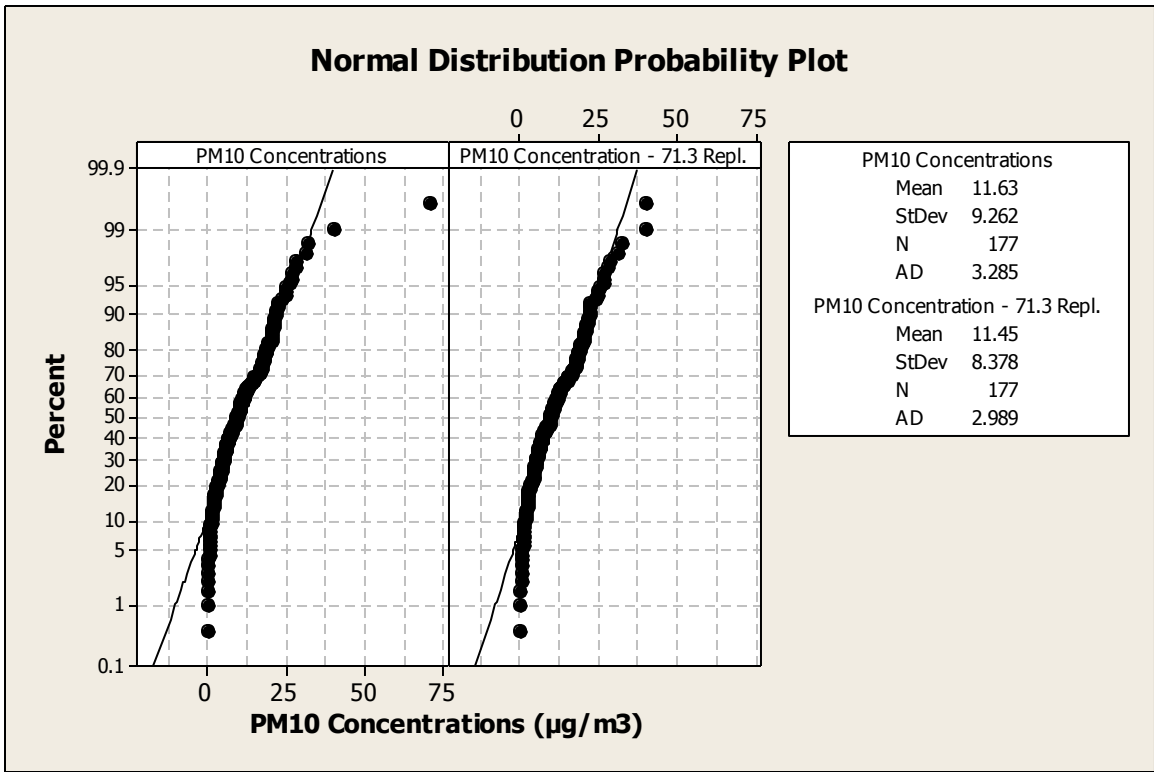
Descriptive Statistics: PM10 Concentrations

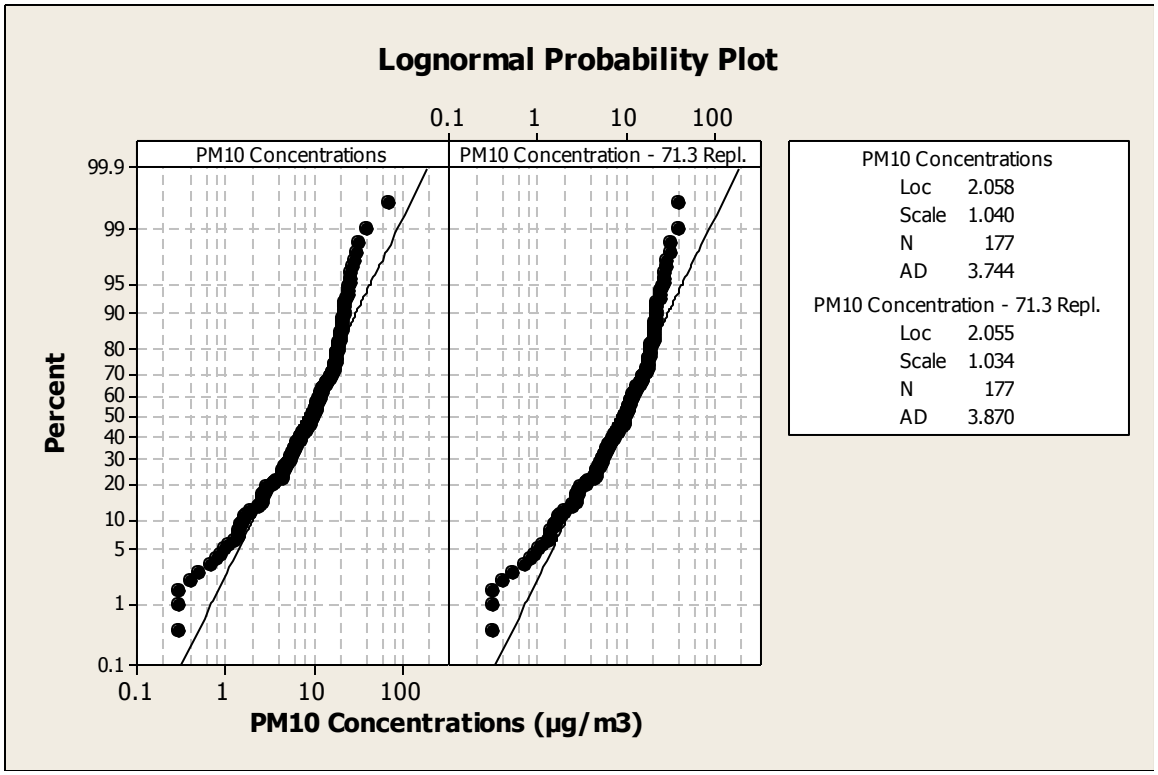
Variable	Total Count	N	N*	CumN	Percent	CumPct	Mean	SE Mean
PM10 Concentrations	177	177	0	177	100	100	11.625	0.696

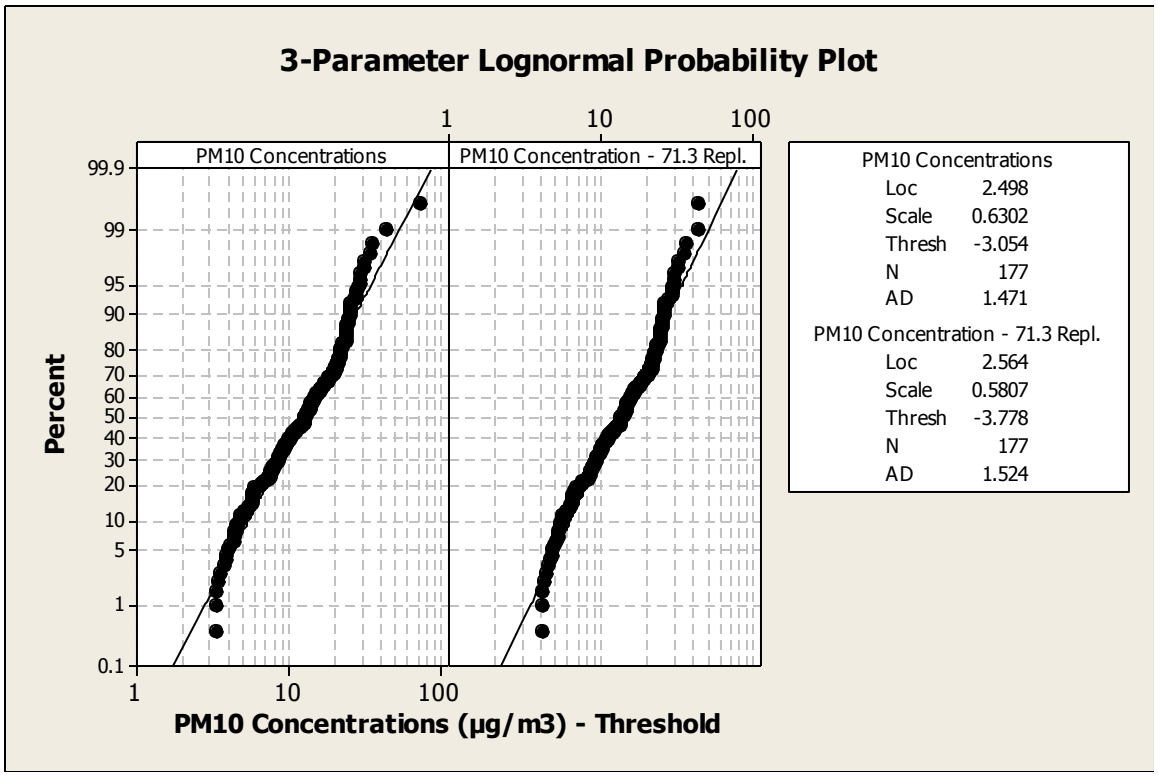
Variable	TrMean	StDev	Variance	CoefVar	Sum	Sum of Squares
PM10 Concentrations	10.937	9.262	85.791	79.67	2057.700	39020.810

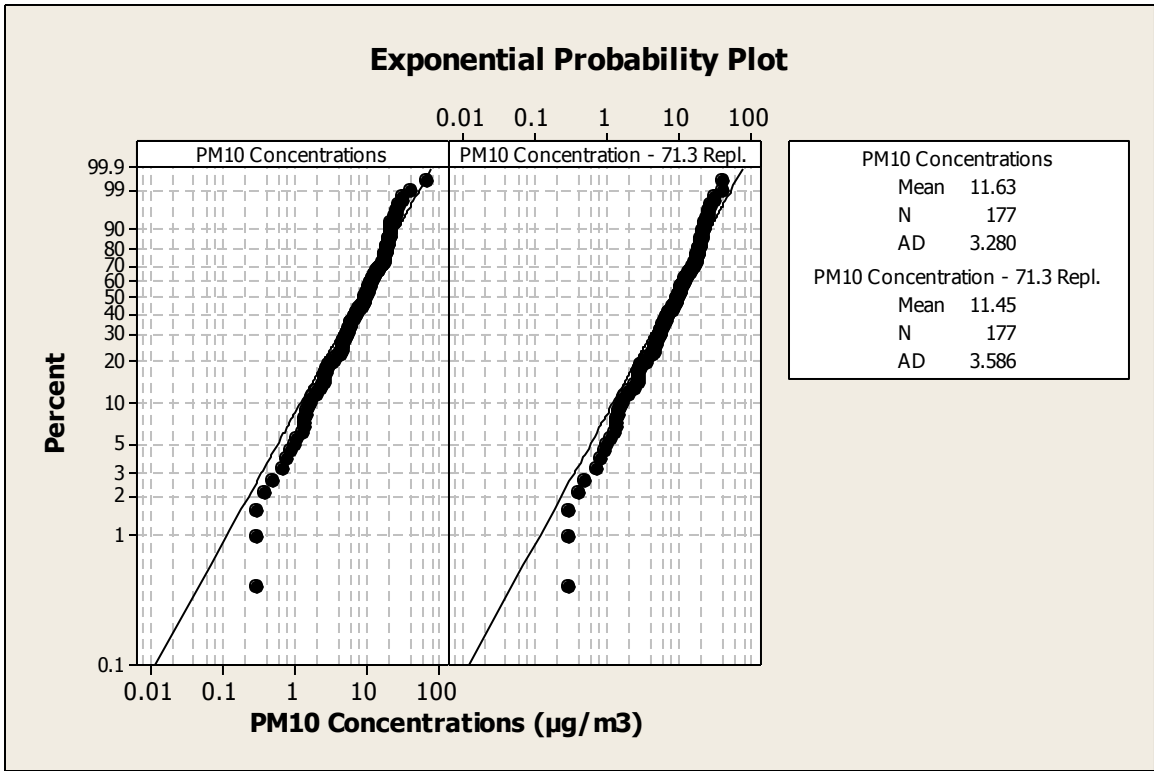
Variable	Minimum	Q1	Median	Q3	Maximum	Range	IQR
PM10 Concentrations	0.300	4.650	9.800	18.050	71.300	71.000	13.400

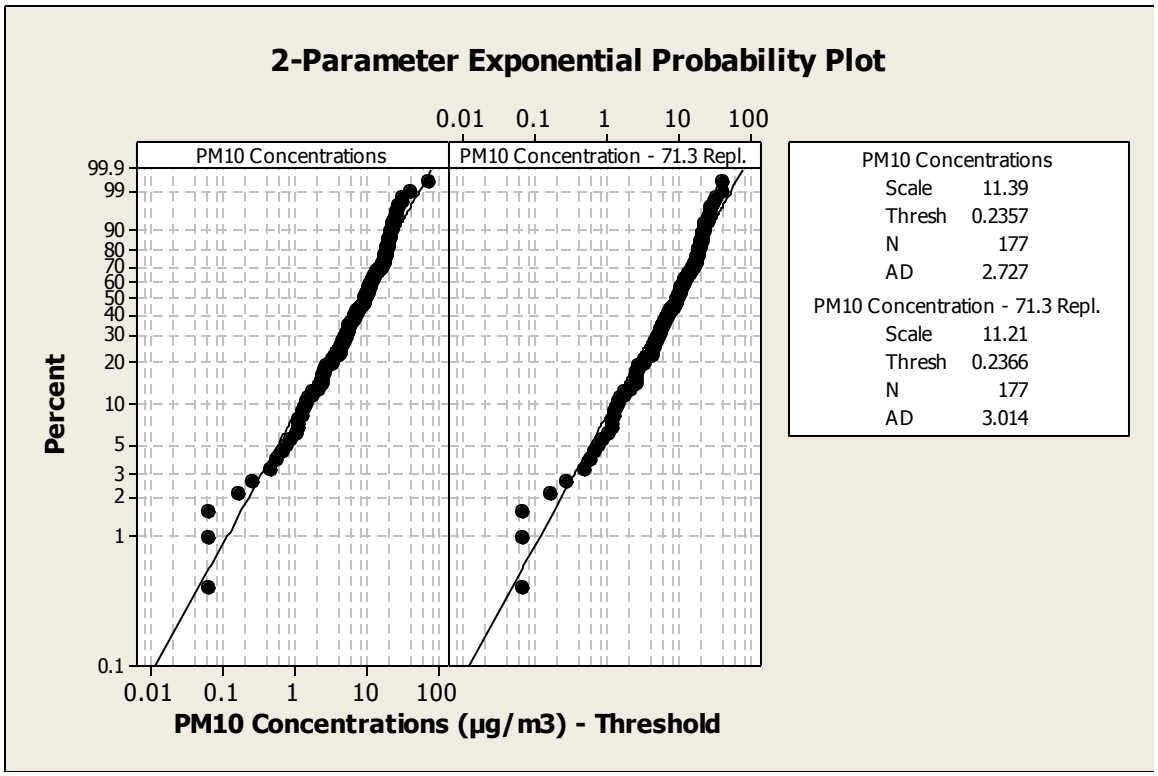
Variable	Mode	N for Mode	Skewness	Kurtosis	MSSD
PM10 Concentrations	2.7	5	1.91	8.77	41.960

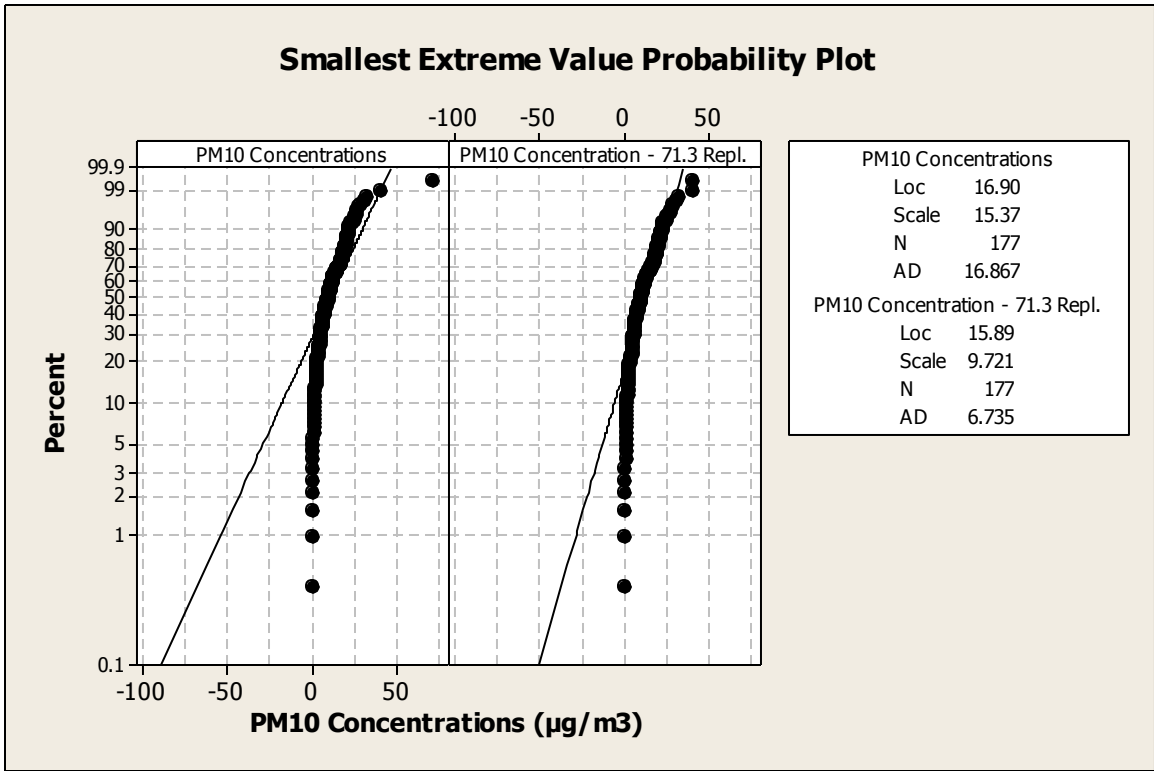

Normal Distribution Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Mean 11.63
StDev 9.262
N 177
AD 3.285
PM10 Concentration - 71.3 Repl.
Mean 11.45
StDev 8.378
N 177
AD 2.989

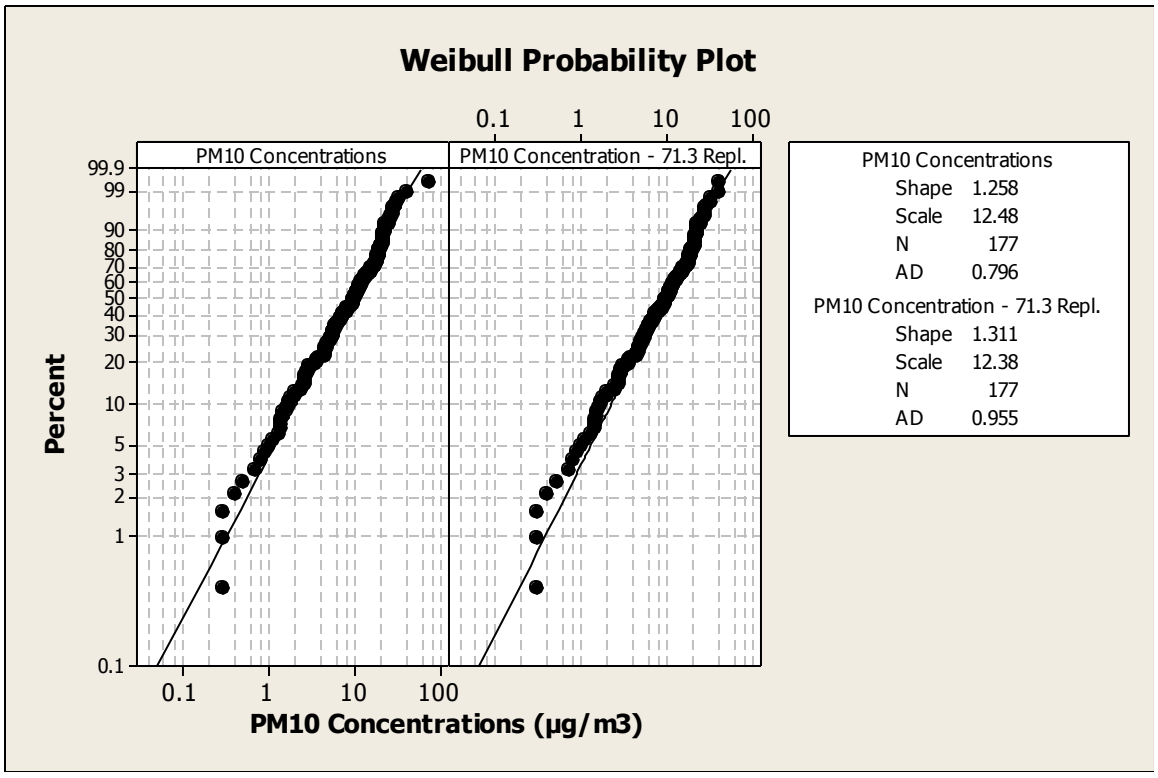

Lognormal Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Loc 2.058
Scale 1.040
N 177
AD 3.744
PM10 Concentration - 71.3 Repl.
Loc 2.055
Scale 1.034
N 177
AD 3.870

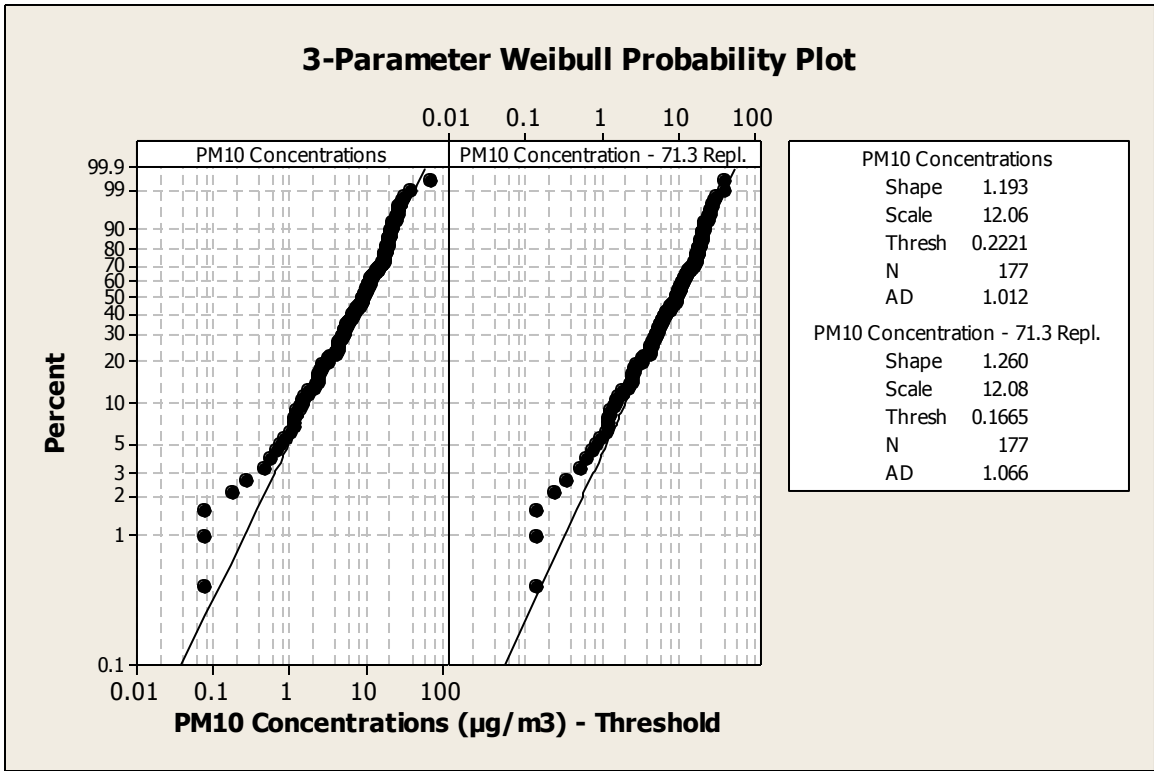

3-Parameter Lognormal Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3) - Threshold
PM10 Concentrations
Loc 2.498
Scale 0.6302
Thresh -3.054
N 177
AD 1.471
PM10 Concentration - 71.3 Repl.
Loc 2.564
Scale 0.5807
Thresh -3.778
N 177
AD 1.524

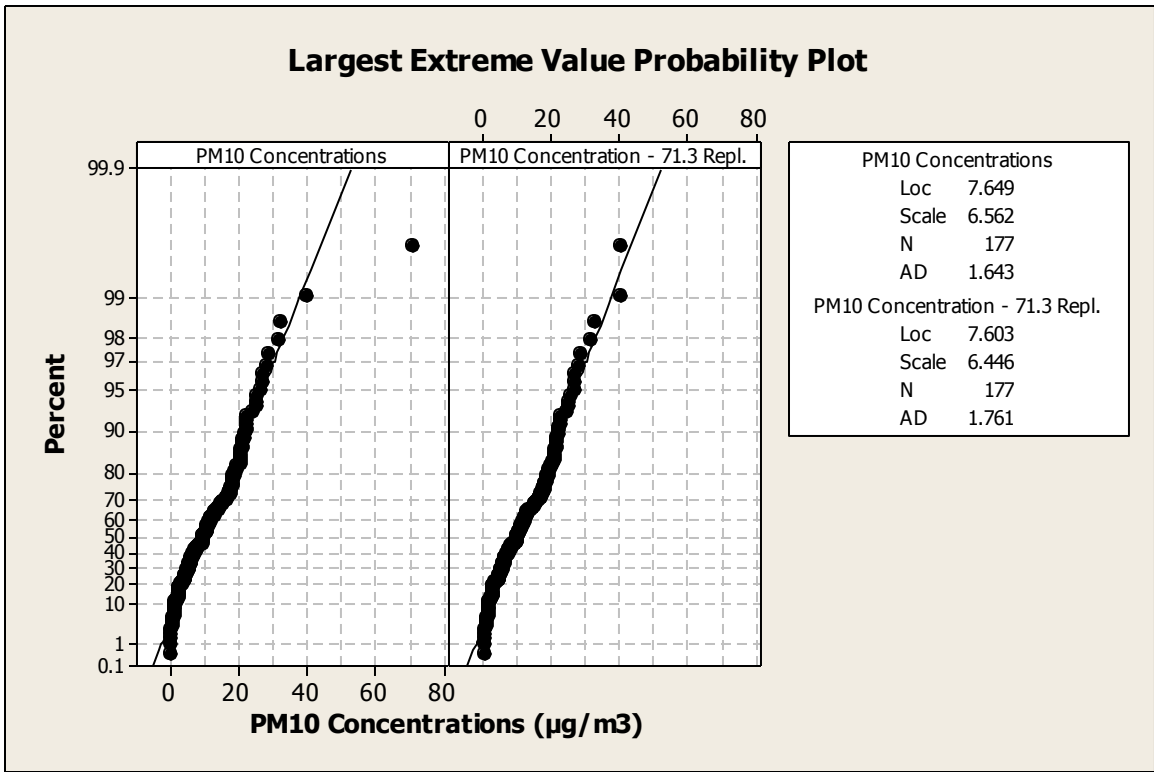

Exponential Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Mean 11.63
N 177
AD 3.280
PM10 Concentration - 71.3 Repl.
Mean 11.45
N 177
AD 3.586

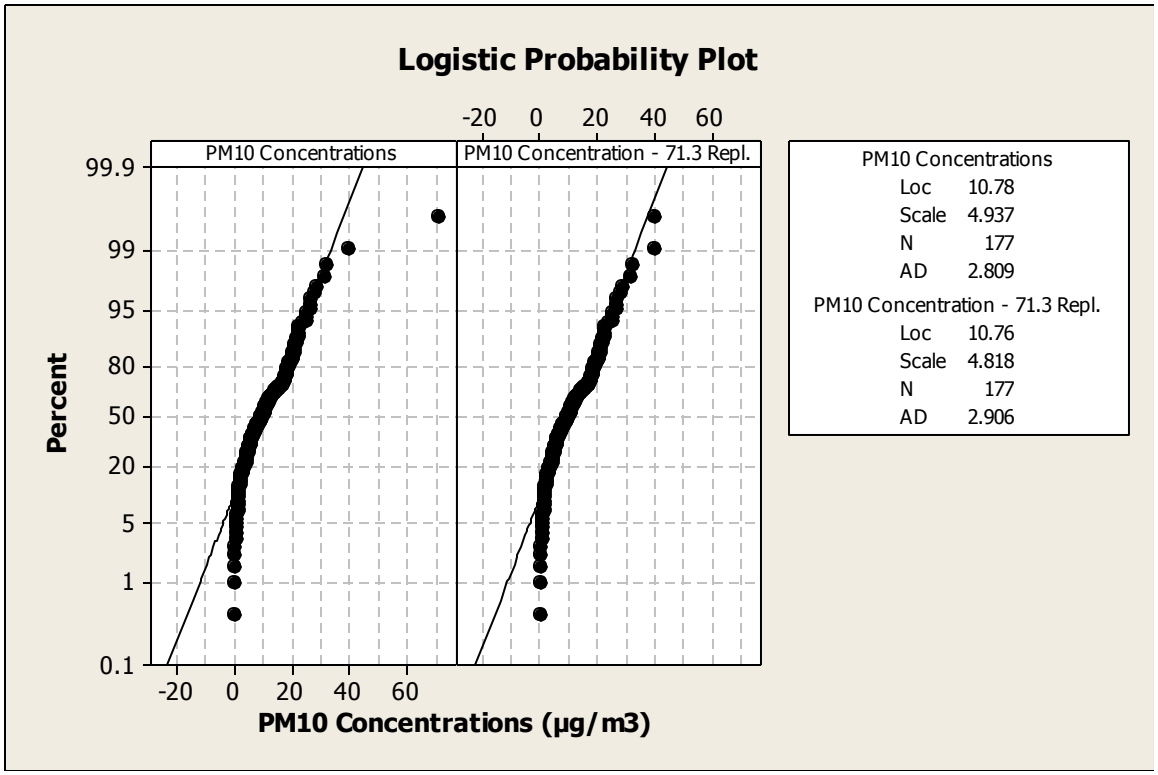

2-Parameter Exponential Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3) - Threshold
PM10 Concentrations
Scale 11.39
Thresh 0.2357
N 177
AD 2.727
PM10 Concentration - 71.3 Repl.
Scale 11.21
Thresh 0.2366
N 177
AD 3.014

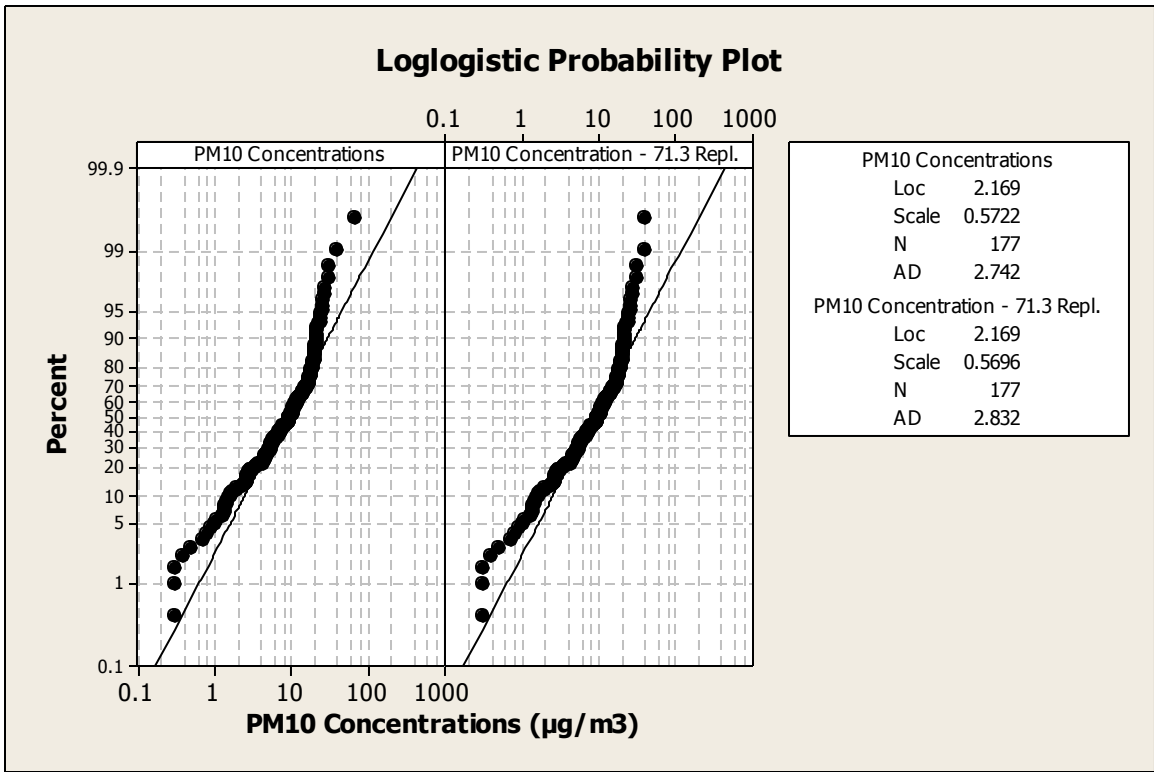

Smallest Extreme Value Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Loc 16.90
Scale 15.37
N 177
AD 16.867
PM10 Concentration - 71.3 Repl.
Loc 15.89
Scale 9.721
N 177
AD 6.735

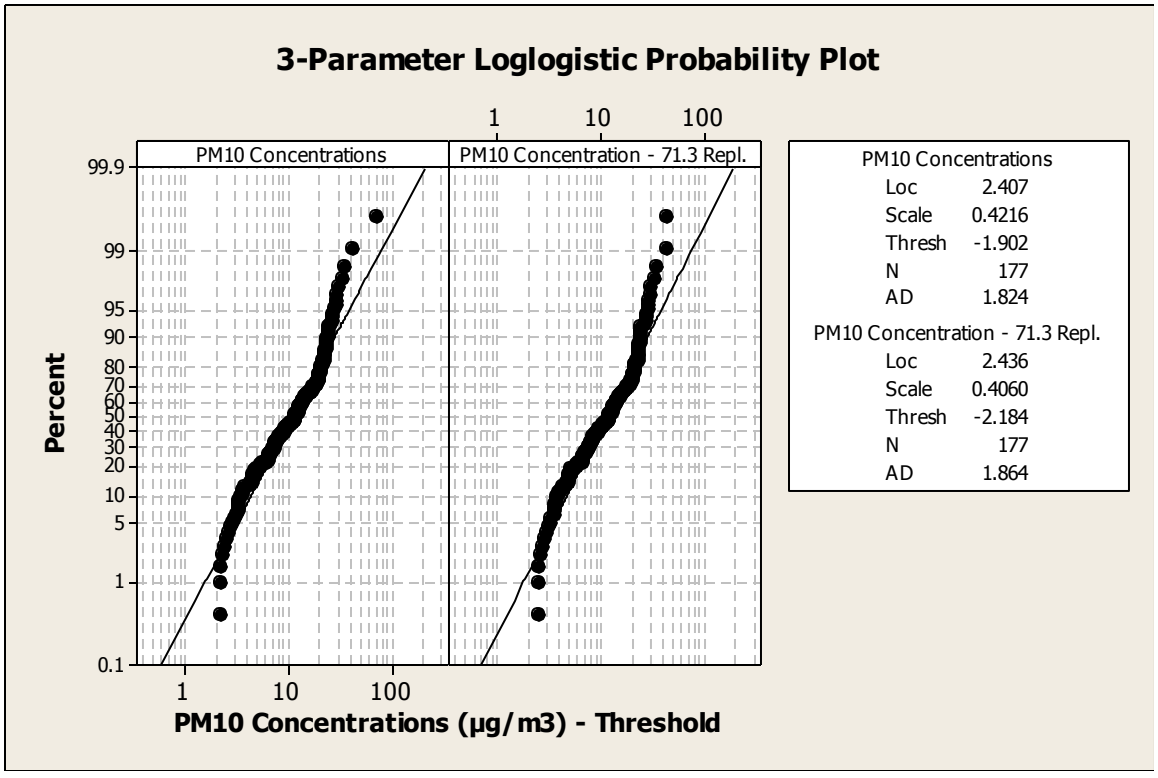

Weibull Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Shape 1.258
Scale 12.48
N 177
AD 0.796
PM10 Concentration - 71.3 Repl.
Shape 1.311
Scale 12.38
N 177
AD 0.955

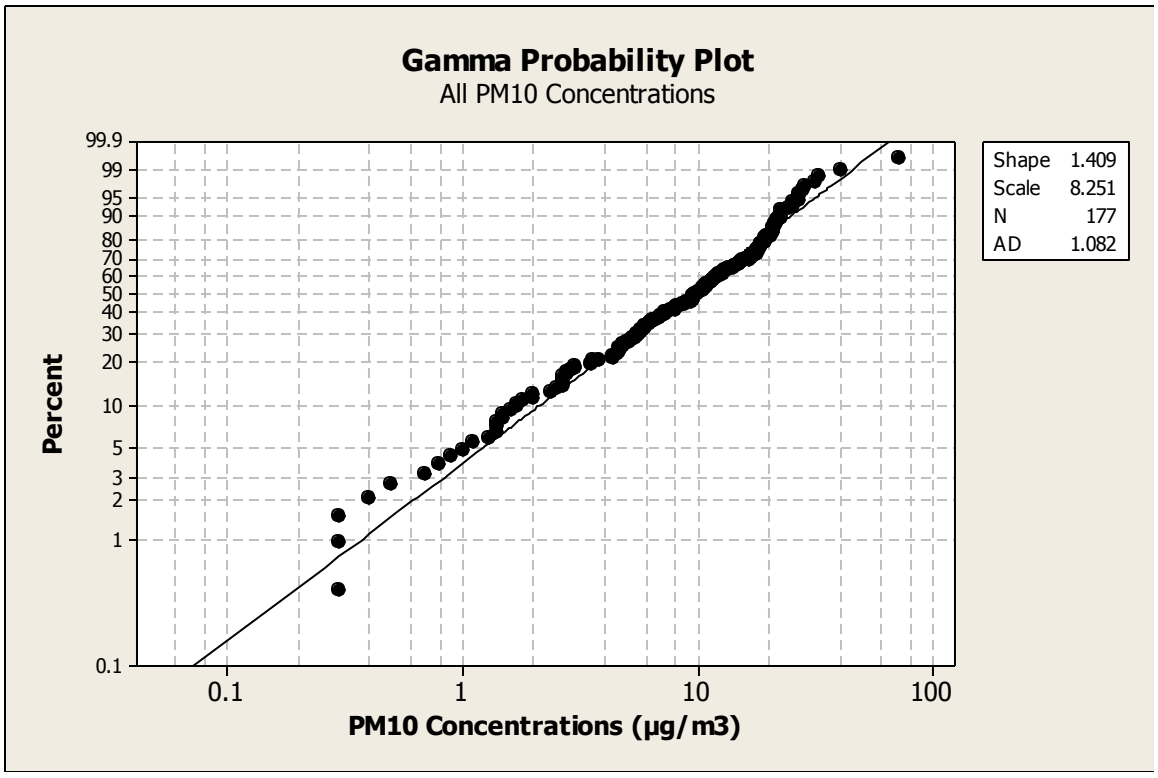

3-Parameter Weibull Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3) - Threshold
PM10 Concentrations
Shape 1.193
Scale 12.06
Thresh 0.2221
N 177
AD 1.012
PM10 Concentration - 71.3 Repl.
Shape 1.260
Scale 12.08
Thresh 0.1665
N 177
AD 1.066

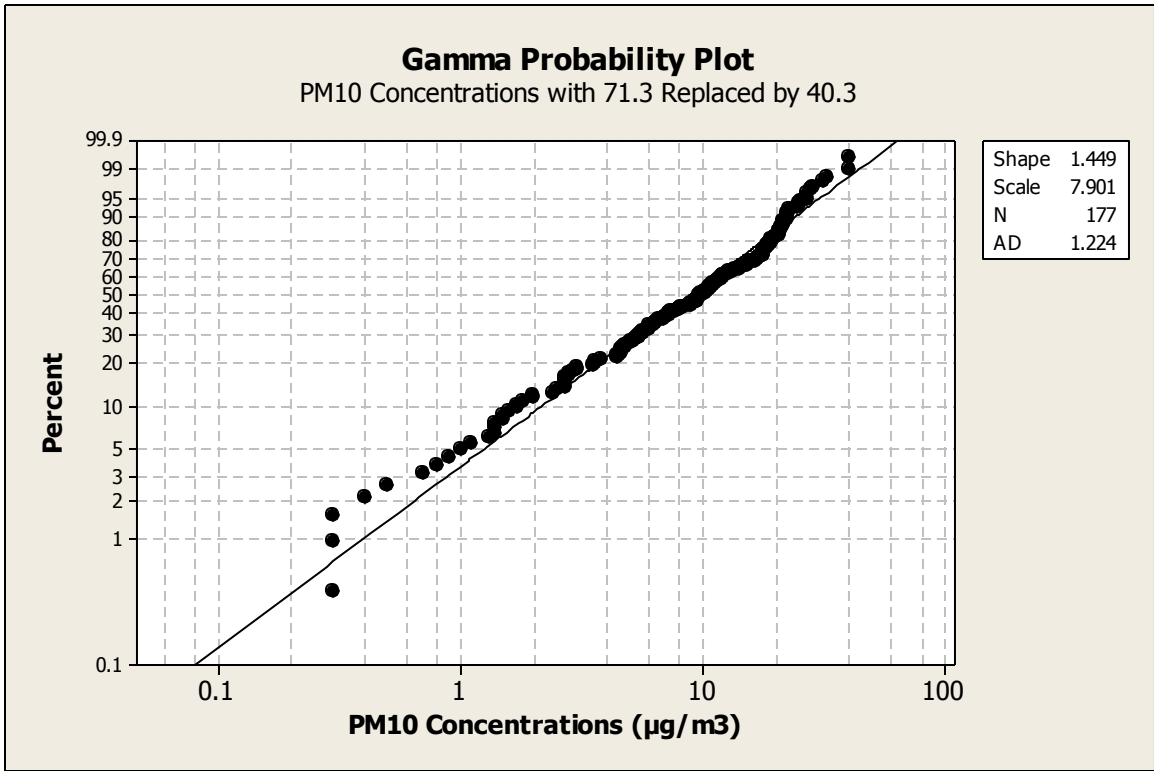

Largest Extreme Value Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Loc 7.649
Scale 6.562
N 177
AD 1.643
PM10 Concentration - 71.3 Repl.
Loc 7.603
Scale 6.446
N 177
AD 1.761

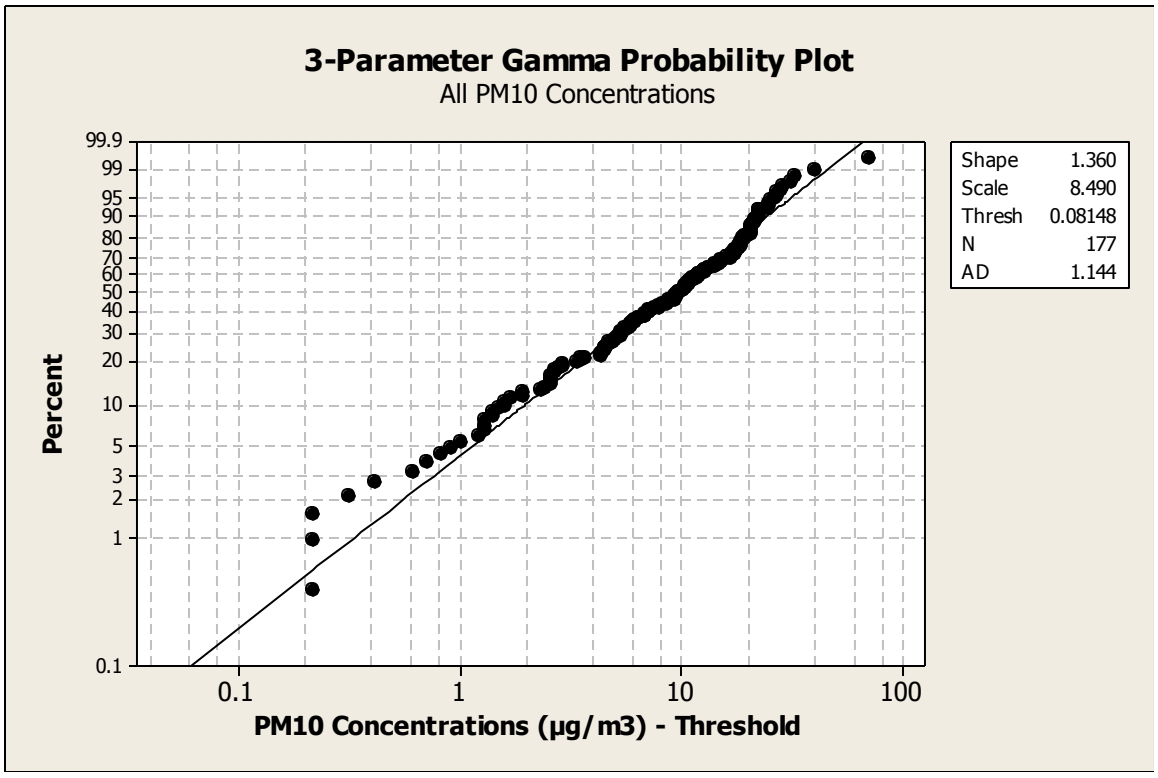

Logistic Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Loc 10.78
Scale 4.937
N 177
AD 2.809
PM10 Concentration - 71.3 Repl.
Loc 10.76
Scale 4.818
N 177
AD 2.906

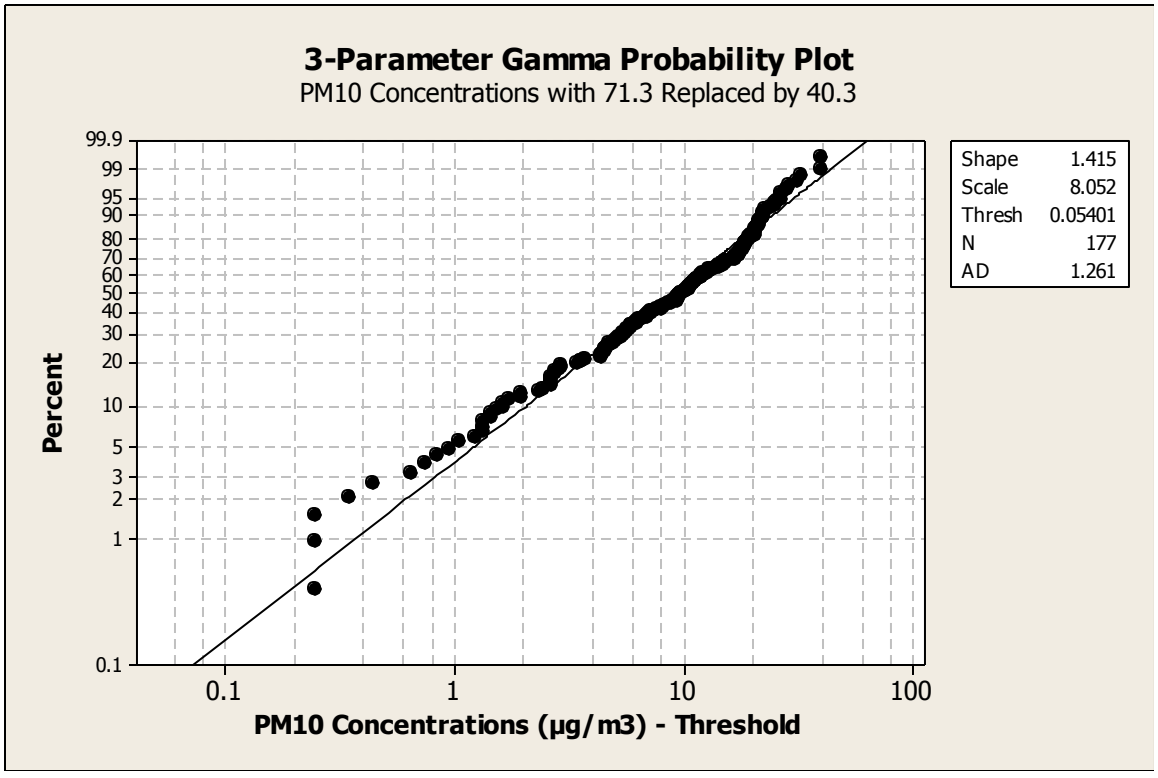

Loglogistic Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3)
PM10 Concentrations
Loc 2.169
Scale 0.5722
N 177
AD 2.742
PM10 Concentration - 71.3 Repl.
Loc 2.169
Scale 0.5696
N 177
AD 2.832


3-Parameter Loglogistic Probability Plot
PM10 Concentrations
PM10 Concentration - 71.3 Repl.
Percent
PM10 Concentrations (µg/m3) - Threshold
PM10 Concentrations
Loc 2.407
Scale 0.4216
Thresh -1.902
N 177
AD 1.824
PM10 Concentration - 71.3 Repl.
Loc 2.436
Scale 0.4060
Thresh -2.184
N 177
AD 1.864


Gamma Probability Plot
All PM10 Concentrations
Percent
99.9
99
95
90
80
70
60
50
40
30
20
10
5
3
2
1
0.1
0.1
1
10
100
PM10 Concentrations (µg/m3)
Shape 1.409
Scale 8.251
N 177
AD 1.082


Gamma Probability Plot
PM10 Concentrations with 71.3 Replaced by 40.3
Percent
99.9
99
95
90
80
70
60
50
40
30
20
10
5
3
2
1
0.1
0.1
1
10
100
PM10 Concentrations (µg/m3)
Shape 1.449
Scale 7.901
N 177
AD 1.224


3-Parameter Gamma Probability Plot
All PM10 Concentrations
Percent
99.9
99
95
90
80
70
60
50
40
30
20
10
5
3
2
1
0.1
0.1
1
10
100
PM10 Concentrations (µg/m3) - Threshold
Shape 1.360
Scale 8.490
Thresh 0.08148
N 177
AD 1.144


3-Parameter Gamma Probability Plot
PM10 Concentrations with 71.3 Replaced by 40.3
Percent
99.9
99
95
90
80
70
60
50
40
30
20
10
5
3
2
1
0.1
0.1
1
10
100
PM10 Concentrations (µg/m3) - Threshold
Shape 1.415
Scale 8.052
Thresh 0.05401
N 177
AD 1.261

Probability Density Function

```
Weibull with shape = 1.258 and scale = 12.48
   x     f( x )
40.3  0.0017264
```

Cumulative Distribution Function

```
Weibull with shape = 1.258 and scale = 12.48
   x  P( X <= x )
40.3     0.987343
```

Probability Density Function

```
Weibull with shape = 1.258 and scale = 12.48
   x     f( x )
71.3  0.0000204
```

Cumulative Distribution Function

```
Weibull with shape = 1.258 and scale = 12.48
   x  P( X <= x )
71.3     0.999871
```

Probability Density Function

```
Weibull with shape = 1.311 and scale = 12.38
   x     f( x )
40.3  0.0013918
```

Cumulative Distribution Function

```
Weibull with shape = 1.311 and scale = 12.38
   x  P( X <= x )
40.3     0.990895
```

Probability Density Function

```
Weibull with shape = 1.311 and scale = 12.38
   x     f( x )
71.3  0.0000089
```

Cumulative Distribution Function

```
Weibull with shape = 1.311 and scale = 12.38
   x  P( X <= x )
71.3     0.999951
```

APPENDIX D

AVERAGE AND MAXIMUM MINING RATES

Table D.1 Annual Mining and Haul Truck Process Rates						
Year	Mining Process Rates (tons/year)			Haul Truck Process Rates (VMT/year)		
	Ore	Waste	Total	Inside the Pit	Outside the Pit	Total
PP-2	0	1,688,000	1,688,000	1,279	21,489	22,768
PP-1	10,665,000	62,231,000	72,896,000	151,724	1,329,627	1,481,351
1	42,172,000	72,821,000	114,993,000	495,174	1,741,939	2,237,113
2	42,127,000	72,242,000	114,369,000	573,472	1,571,449	2,144,921
3	37,005,000	72,370,000	109,375,000	681,809	1,234,790	1,916,599
4	31,277,000	78,094,000	109,371,000	793,148	1,390,710	2,183,858
5	29,197,000	80,177,000	109,374,000	1,169,202	1,624,041	2,793,243
6	37,134,000	71,241,000	108,375,000	783,422	1,214,853	1,998,276
7	27,376,000	81,998,000	109,374,000	924,290	1,311,106	2,235,396
8	27,376,000	81,996,000	109,372,000	723,846	908,705	1,632,551
9	27,376,000	81,994,000	109,370,000	864,579	1,114,705	1,979,284
10	27,376,000	81,500,000	108,876,000	1,085,986	1,129,025	2,215,011
11	27,376,000	77,000,000	104,376,000	1,180,062	1,267,800	2,447,862
12	27,376,000	68,000,000	95,376,000	1,367,410	1,334,886	2,702,296
13	27,376,000	77,999,000	105,375,000	1,044,548	1,234,969	2,279,518
14	27,376,000	64,999,000	92,375,000	1,149,575	1,104,718	2,254,294
15	27,376,000	51,998,000	79,374,000	1,210,908	984,951	2,195,859
16	27,376,000	40,513,000	67,889,000	1,289,484	841,752	2,131,237
17	27,376,000	4,927,000	32,303,000	643,804	241,285	885,089
18	27,376,000	1,434,000	28,810,000	600,867	171,088	771,955
19	27,376,000	144,000	27,520,000	630,667	164,425	795,092
20	27,376,000	4,368,000	31,744,000	815,388	297,982	1,113,370
21	2,870,000	15,431,000	18,301,000	534,813	201,104	735,917

Table D.2 Maximum Daily Mining and Haul Truck Process Rates

Year	Mining Process Rates (tons/day)						Haul Truck Process Rates (VMT/day)					
	Average			Maximum [a]			Average			Maximum [a]		
	Ore	Waste	Total	Ore	Waste	Total	Inside the Pit	Outside the Pit	Total	Inside the Pit	Outside the Pit	Total
PP-2	0	4,625	4,625	0	4,625	4,625	14	235	250	14	235	250
PP-1	29,219	170,496	199,715	29,219	170,496	199,715	416	3,643	4,058	416	3,643	4,058
1	115,540	199,510	315,049	115,540	199,510	315,049	1,357	4,772	6,129	1,357	4,772	6,129
2	115,416	197,923	313,340	138,500	237,508	376,008	1,571	4,305	5,876	1,885	5,166	7,052
3	101,384	198,274	299,658	121,660	237,929	359,589	1,868	3,383	5,251	2,242	4,060	6,301
4	85,690	213,956	299,647	102,828	256,747	359,576	2,173	3,810	5,983	2,608	4,572	7,180
5	79,992	219,663	299,655	95,990	263,596	359,586	3,203	4,449	7,653	3,844	5,339	9,183
6	101,737	195,181	296,918	122,084	234,217	356,301	2,146	3,328	5,475	2,576	3,994	6,570
7	75,003	224,652	299,655	90,003	269,582	359,586	2,532	3,592	6,124	3,039	4,310	7,349
8	75,003	224,647	299,649	90,003	269,576	359,579	1,983	2,490	4,473	2,380	2,988	5,367
9	75,003	224,641	299,644	90,003	269,569	359,573	2,369	3,054	5,423	2,842	3,665	6,507
10	75,003	223,288	298,290	90,003	267,945	357,948	2,975	3,093	6,069	3,570	3,712	7,282
11	75,003	210,959	285,962	90,003	253,151	343,154	3,233	3,473	6,706	3,880	4,168	8,048
12	75,003	186,301	261,304	90,003	223,562	313,565	3,746	3,657	7,404	4,496	4,389	8,884
13	75,003	213,696	288,699	90,003	256,435	346,438	2,862	3,383	6,245	3,434	4,060	7,494
14	75,003	178,079	253,082	90,003	213,695	303,699	3,150	3,027	6,176	3,779	3,632	7,411
15	75,003	142,460	217,463	90,003	170,952	260,956	3,318	2,698	6,016	3,981	3,238	7,219
16	75,003	110,995	185,997	90,003	133,193	223,197	3,533	2,306	5,839	4,239	2,767	7,007
17	75,003	13,499	88,501	90,003	16,198	106,202	1,764	661	2,425	2,117	793	2,910
18	75,003	3,929	78,932	90,003	4,715	94,718	1,646	469	2,115	1,975	562	2,538
19	75,003	395	75,397	90,003	473	90,477	1,728	450	2,178	2,073	541	2,614
20	75,003	11,967	86,970	90,003	14,361	104,364	2,234	816	3,050	2,681	980	3,660
21	7,863	42,277	50,140	9,436	50,732	60,168	5,861	2,204	8,065	7,033	2,645	9,678

[a] Maximum mining process rates are calculated by adding a 20% maximum capacity factor to the average process rates (except for Years PP-2, PP-2, and 1 when maximum process rates are not expected to exceed average process rates).

APPENDIX E

CORRESPONDENCE WITH ADEQ

From: Herbert J. Verville
To: Shantanu Kongara
Subject: FW: Rural Background Concentrations
Date: Tuesday, September 16, 2008 11:13:47 AM
Attachments: Rural Background.xls

-----Original Message-----
From: Tim Martin [mailto:Martin.Tim@ev.state.az.us]
Sent: Monday, March 29, 2004 7:31 AM
To: hverville@aecinc.org
Cc: Peter Hyde
Subject: Rural Background Concentrations

March 29, 2004

Herb:

I have attached an example of rural background concentrations for NO2, SO2, and CO in Arizona. The footnotes for the table explain the basis of the values. These values are typically used by ADEQ when modeling Class II (minor) sources. As always, try your best to utilize representative background data that was actually measured. When all else fails, utilize the NO2 and CO data in the table. Please contact me with questions.

-Tim

Timothy S. Martin
Arizona Dept. of Environmental Quality
Air Quality Division
Phone: (602) 771-2357
Fax: (602) 771-2366
E-mail: tsm@ev.state.az.us

Rural Arizona

Example Background Concentrations

Pollutant	Averaging Time	Ambient Data			Background Value (μg/m3)	Standard (μg/m^3)
		1999	2000	2001		
NO_2[a]	annual	---	---	---	4	100
CO[b]	1-hour	---	---	---	582	40,000
	8-hour	---	---	---	582	10,000
SO_2	3-hour	43	14	15	43	1,300
	24-hour	17	7	8	17	365
	annual	2	1	3	3	80

[a] Long-term average value (0.002 ppm) of several monitors located near power plants in rural areas of Arizona

[b] Typical continental ambient CO background value (0.5 ppm) used in most regional models

[c] Max. values over 3-year period from Page monitoring station (Coconino County)

From: Leonard H. Montenegro
To: skongara@aecinc.org
Cc: Feng Mao
Subject: RE: Tail Pipe Emissions
Date: Friday, August 14, 2009 10:53:48 AM

Shantanu,
Please see below and in the future, feel free to direct your questions to Feng Mao or myself.
Cordially,
Leonard

-----Original Message-----
From: Feng Mao
Sent: Wed 8/12/2009 4:32 PM
To: Leonard H. Montenegro
Subject: RE: Tail Pipe Emissions

Leonard,

Table 3.3-1 in AP-42 provides the emission factors for PM10 with an assumption of "all particulate is assumed to be <1um in size". This assumption indicates that all particulate emissions are PM2.5 (the emission rate of PM10 is identical to that of PM2.5).

Based on Appendix B.2 of AP-42, the emission rate for PM2.5 is around 94% of the emission rate for PM10.

I did not see much difference between the two methods. To be conservative for modeling PM2.5, it is recommended to assume that all of the particulate emissions from tail pipes are PM2.5.

Feng

From: Leonard H. Montenegro
Sent: Wednesday, August 12, 2009 3:12 PM
To: Feng Mao
Subject: FW: Tail Pipe Emissions

Can you look this up?

Thanks

Feng Mao - Air Quality Modeler - Air Assessment Section - ADEQ
Leonard H. Montenegro - Supervisor Air Quality Evaluation Group - ADEQ (formerly)

APPENDIX F

IN-STACK NO_2/NO_x RATIO JUSTIFICATION

Leonard Montenegro
1025 E. Sandpiper Dr.
Tempe, AZ 85283

May 10, 2011
Louis C. Thanukos Ph.D.
Applied Environmental Consultants, a JBR company
1553 W. Elna Rae
Tempe, AZ 85281-6935

Subject: Evaluation of representative primary NO_2/NOx ratios for use in modeling haul-truck emissions as part of the Rosemont Copper Project Ambient Impact Analysis.

Dear Dr. Thanukos,
As requested, the following documents provides an abridged overview of AERMOD's oxidation module, its methodology for estimating NO_2/NO_x ratios and a basis for selecting appropriate data for the *in-stack* input parameter. Also provided is a review of literature pertinent to sampling methods used for measuring primary NOx emissions. This document may also be used to provide support for modeling NO_2 impacts from Rosemont's haul-truck emissions, using an in-stack NO_2/NO_x ratio of 5%.

Cordially,
Leonard Montenegro

About the author

Leonard Montenegro is an independent consultant who specializes in air quality modeling and air quality modeling systems. Leonard's area of expertise is in High Performance Computing (HPC) using air quality models. He has 10 years of experience in the public sector, with a main focus on air quality modeling. Other areas include mobile source, emissions and meteorological modeling with models such as MOVES, SMOKE and the Weather Research and Forecasting Model (WRF). Leonard has developed autonomous weather forecasting systems for clients worldwide and has developed a variety of web-based software tools related to air quality. Leonard's recent areas of work include predictive analytics and air quality tools for mobile platforms.

Leonard's professional and public service includes 6 years with the Center for Environmental Fluid Dynamics at Arizona State University and 10 years for the Arizona Department of Environmental Quality where he supervised the Air Quality Evaluation group. The Evaluation group's responsibilities included both administering and reviewing modeling and scientific analyses relevant to air pollution permitting and planning. Leonard has also managed an assortment of air pollution studies relating to, for example: attainment demonstrations for State Implementation Plans (SIP), public health assessments from exposure to air toxics and air pollution impacts along the U.S. - Mexico border.

Leonard received his Bachelor's degree in chemistry from Arizona State University and has co-authored papers relating to air pollution science and technology.

Evaluation of Representative Primary NO_2/NOx Ratios for use in Modeling Mobile Source Emissions as Part of the Rosemont Copper Project Ambient Impact Analysis.

Executive Summary

Nitrogen-dioxide (NO_2) pollution from industrial sources is a product of two distinct processes—primary NO_2 from combustion and the formation of secondary NO_2 from oxidation of nitric oxide (NO) by ozone (O_3) in ambient air. Dispersion models, like AERMOD (USEPA's guideline dispersion model), can be used to estimate ambient NO_2 impacts from plumes emitted by large industrial stacks, by using stack test data for the in-stack model input parameter. However, data from stack tests does not exist for other source types, such as mobile on- and off-road source categories. Therefore, an in-stack equivalent must be selected from available data.

This document discusses the basis for differentiating among data-sampling methods to determine representative primary, or "in-stack," NO_2/NO_x fractions for modeling mobile sources and presents current research to support an in-stack ratio of 5% for Rosemont's mobile source NO_x emissions.

Introduction

The current short-term NAAQS (National Ambient Air Quality Standard) for NO_2 (nitrogen dioxide) became effective April 12, 2010. Industrial sources can demonstrate compliance with the standard by using either source-oriented ambient NO_2 monitoring data or by relying on estimates provided by air-quality dispersion modeling. NO_2 monitors measure ambient hourly NO_2 concentrations, which can be compared directly to the NO_2 NAAQS. However, industrial-source emissions are reported as total NO_x, which is a composite of NO_2 and NO. Air-quality models must, therefore, simulate the dispersion and transformation of NO_x to NO_2 before any comparisons to the NAAQS can be made. Most photochemical models use elaborate chemical transformation schemes to simulate secondary NO_2 formation, but they are generally intended for long-range air-quality studies and not for localized air-quality impacts from industrial sources. In any event, model selection is dictated by federal guidance, which generally limits industrial-source permit modeling to AERMOD (which uses a rather simple NO_2 oxidation scheme to simulate NO_x transformations).

AERMOD is primarily a steady-state plume-dispersion model; therefore, it must rely on built-in oxidation models like OLM (Ozone Limiting Method) and PVMRM (Plume Volume Molar Ratio Method) to estimate ambient ratios of NO_2 /NO_x, based initially upon representative NO_2/NO_x data from in-stack NO_x emissions. The ambient NO_2 ratio is estimated by computing the sum of the fraction of in-stack NO_2 formed during combustion—called the primary NO_2/NO_x ratio—with the fraction of secondary NO_2, transformed from NO in the ambient air by mixing and by oxidation by ozone. At minimum, AERMOD requires a representative estimate for the primary NO_2 fraction. Modeling industrial stacks using either OLM or PVMRM is typically straight forward, since in-stack NO_x data collected from compulsory EPA stack testing is usually available. To the contrary, modeling NO_2 impacts from mobile sources is not straight forward,

since stack testing does not apply to mobile sources and mobile source plume behaviors is distinctively different from plumes emitted from elevated stacks.

The body of literature from studies pertinent to mobile source NOx emissions is comprised of data collected from a variety of sampling methods. The primary objective of this document is to present representative NO_2/NO_x estimates, based on only those studies in which primary NO_2 was sampled by either direct (in-stack or in-pipe) measurement methods or by methods designed for mitigating oxidation from ambient ozone, via measuring NO_x inside of tunnels.

The following reports support a primary NO_2 in-stack fraction of 5%

- "Nitrogen Oxides Reactions in Diesel Oxidation Catalyst." – Majewski, et al.
  - *Reports a maximum primary NO_2 ratio of 5.3%*
- "The use of tunnel concentration profile data to determine the ratio of NO_2/NO_x directly emitted from vehicles" – X. Yao, et al.
  - *Reports a primary NO_2 range of 2% to 6%*
- Letter from Caterpillar dated April 27, 2011
  - *States that engine-out NO_2 can typically range from 5% to 15%*
- Sensitivity Analysis of PVMRM and OLM in AERMOD. - USEPA
  - *Modeling analysis used an in-stack ratio of 5% for arbitrary sources*
- Philadelphia Exposure Assessment Case-Study - USEPA
  - *Modeling analysis used a 10% in-stack ratio for off-road vehicles*
- "Risk and Exposure Assessment to Support the Review of the NO_2 Primary National Ambient Air Quality Standard" - USEPA
  - *Modeling analysis used a 10% in-stack ratio for off-road vehicle*

Discussion

Traditional NO_x measurements from power plants are often derived from in-stack measurements, in accordance with USEPA Test Method 7 (1). Stack test data is ideal for oxidation models, since OLM and PVMRM require, as input, the ratio of primary NO_2/NO_x—representative of NO_x emissions before the exhaust gases leave the stack (2). However, selecting representative in-stack NO_2/NO_x data for modeling mobile sources can be complicated. Stack testing does not apply to mobile sources, and established EPA mobile-source test methods are not well suited to provide primary NO_2 measurements.

For example, EPA's continuously integrated test method for NO_x emissions samples engine-out exhaust, which has been mixed with ambient air and allowed to cool to near ambient temperature (3). Also, EPA's bag-sample method, where diluted exhaust gas is collected and analyzed at ambient temperature, also allows cooling and is not a representative measure of "in-stack" primary NO_2. Since the model's in-stack parameter requires measurements that are representative of NO_x emissions before they leave the stack, data derived from EPA's test procedures are inappropriate for model input.

There are alternative data sources for mobile-source emissions, but discretion should be used to differentiate samples that are representative of primary NO_2 from combustion, from those that

may likely include an appreciable degree of oxidation. There are two important considerations for determining appropriate NO_2/NO_x ratios for off-road diesel vehicles. First, the ratio of NO_2/NO_x must be representative of primary NO_2 formed from combustion—engine-out measurements made inside the tail pipe (in-pipe) are preferred. The second consideration must account for NO_2 formed by diesel after treatment technologies, such as Continuously Regenerating Technology (CRT), which reduce particulate emissions but can increase the in-pipe fraction of NO_2 by forcing oxidation of NO to NO_2 across a catalyst. Most research suggests that diesel engines fitted with CRT can increase the in-pipe NO_2 to 30%, on average. However, not all diesel after-treatment technologies have adverse impacts on in-pipe NO_2.

The study "Nitrogen Oxides Reactions in Diesel Oxidation Catalyst" (4) discussed the influences of platinum and palladium oxidation catalysts on NO_x transformations in diesel exhaust from a Caterpillar 3304 mining diesel engine. The apparatus design was comprised of a direct (i.e., in-pipe) sampling method using Fourier Transform Infrared (FTIR) and was set up to allow sampling before and after each catalyst. At a maximum conversion temperature of approximately 380 degrees C, the platinum catalyst increased NO_2 from approximately 5 ppm to 25 ppm, while NO was reduced from 625 ppm to 475 ppm. The values are approximations, since the report only provided the data in chart form. However, even with a fourfold increase in NO_2, the maximum NO_2/NO_x ratio was 5.3%. The maximum pre-catalyst NO_2/NO_x was approximately 3.5% at 150 degrees C, where NO was 200 ppm and NO_2 was 7 ppm.

Tunnel sampling methods can also provide an estimate of primary NO_2, since the air near the center of long tunnels often has less oxidation potential than ambient air, outside the tunnel. The study "The Use of Tunnel Concentration Profile Data to Determine the Ratio of NO_2/NO_x Directly Emitted from Vehicles" (5) details a procedure for estimating the primary NO_2 fraction from NO_x measurements made in two separate tunnels; each tunnel was approximately 4 km in length. At the center of each tunnel, atmospheric oxidation potential is limited (albeit not likely entirely absent). Ambient pollutant concentrations are measured inside the tunnel at different locations. Higher NO_2/NO_x ratios were measured near each tunnel's entrance and exit. The lowest NO_2/NO_x ratios (2% to 6%) were measured near the center of each tunnel. Measurements near the tunnels' centers can be considered very conservative estimates for thermal NO_2/NO_x, since measurements are made in the open air and at ambient temperatures, yet with very limited oxidation potential.

In a letter provided by Caterpillar, Caterpillar states that emission test procedures for on- and off-road equipment follow applicable regulations. As a general rule, Caterpillar claims that engine-out NO_2/NO_x can range from 5% to 15% NO_2, but that oxidation catalysts and diesel particulate filters can increase the ratio of engine-out NO_2. It is unclear, however, if Caterpillar estimates are for engine-out or tailpipe NO_2. EPA also suggests that mobile-source NO_2 emissions from diesel vehicles with DPF can have elevated NO_2/NO_x ratios, as compared to non-catalyzed diesel vehicles. In Shorter et al., (6) diesel vehicles fitted with DPF/CRT had an average NO_2/NO_x ratio of 30%, while ambient measurements from non-catalyzed vehicles were below 10% NO_2/NO_x.

In section 8.4 of EPA's "Risk and Exposure Assessment to Support the Review of the NO_2 Primary National Ambient Air Quality Standard" (7) AERMOD was set up to model ambient NO_2 impacts in Atlanta, GA. OLM was used for roadway and airport emissions, and PVMRM was used for point sources. All sources were modeled with an in-stack ratio of 10%, including

off-highway diesel airport vehicles. Roadways were modeled as large area sources, with length-to-width ratios of 1:100.

In *Appendix B - Supplement to the NO_2 Exposure Assessment, Section B-3 Philadelphia Exposure Assessment Case-Study* (8), NO_2 air-quality impacts were modeled in the Philadelphia area, with AERMOD. OLM was used for roadway, fugitive, and airport emissions, including off-highway diesel vehicles, with an in-stack NO_2/NO_x ratio of 10%. PVMRM was used to model stacks with an in-stack ratio of 10%.

Conclusions

- In-stack data is available for industrial stacks, not mobile sources.
- In-stack NO_2/NO_x must be representative of exhaust gases before leaving the stack and before any mixing or oxidation by ambient air has occurred.
- Typical mobile-source emissions, which are often measured after mixing with ambient air, are inappropriate for use with OLM or PVMRM.
- According to data sampled from in-pipe diesel exhaust, the maximum ratio of NO_2/NO_x is 5.3%.
- According to data sampled from a tunnel study, estimates of the primary NO_2 fraction range from 2% to 6%.
- Reports of NO_2/NO_x ratios as high as 30% are often reflective of diesel vehicles fitted with diesel after treatment devices.

8. WORKS CITED

(1) EPA - Method 7. (n.d.). *METHOD 7 - DETERMINATION OF NITROGEN OXIDE EMISSIONS FROM STATIONARY SOURCES.*

(2) Hanrahan, P. L. (1999). *The Plume Volume Molar Ratio Method for Determining NO[sub2]/NO[subx] Ratios in Modeling--Part I: Methodology.*

(3) USEPA - Part 89 subpart E - Exhaust Emission Test Procedures. (n.d.). *Title 40:PART 89—CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES Subpart E—Exhaust Emission Test Procedures.*

(4) Majewski, W. A., Ambs, J. L., & Bickel, K. (1995). *NItrogen Oxides Reactions in Diesel Oxidation Catalyst.* Society of Automotive Engineers.

(5) X. Yao, N. T. (2005). *The use of tunnel concentration profiledata to determine the ratio of NO2/NOxdirectly emitted from vehicles.* Atmospheric Chemistry and Physics Discussions.

(6) Shorter, J. H., Herndon, S., Zahniser, M. S., Nelson, D. D., Wormhoudt, J., Demerjian, K. L., et al. (2005). *Real-time measurements of nitrogen oxide emissions from in-use New York City transitbuses using a chase vehicle.* Environ. Sci. Technol.

(7) EPA. (2008). *Risk and Exposure Assessment to Support the Review of the NO2 Primary National Ambient Air Quality Standard: Second Draft.* EPA.

(8) EPA. (n.d.). *Appendix B. Supplement to the NO2 Exposure Assessment.* From *Integrated Science Assessment for Oxides of Nitrogen — Health Criteria.*

APPENDIX G

CHANGES IN EMISSIONS FROM PRIOR SUBMITTALS

Table G.1 Comparison of Non-Fugitive Emissions from the RCP - Proposed Action												
Emission Category	Non-Fugitive Emissions (tpy)											
	PM/TSP	PM_{10}	$PM_{2.5}$	CO	NO_X	SO_2	VOC	H_2SO_4	CO_2	CH_4	N_2O	HAPs
Year 1												
Prior to Mitigation and Refinement [a]	72.44	66.81	53.68	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
After Mitigation and Refinement [b]	78.46	39.03	10.23	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
Change in Emissions	6.02	-27.78	-43.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 5												
Prior to Mitigation and Refinement	72.44	66.81	53.68	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
After Mitigation and Refinement	78.46	39.03	10.23	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
Change in Emissions	6.02	-27.78	-43.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 10												
Prior to Mitigation and Refinement	72.44	66.81	53.68	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
After Mitigation and Refinement	78.46	39.03	10.23	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
Change in Emissions	6.02	-27.78	-43.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 15												
Prior to Mitigation and Refinement	72.44	66.81	53.68	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
After Mitigation and Refinement	78.46	39.03	10.23	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
Change in Emissions	6.02	-27.78	-43.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 20												
Prior to Mitigation and Refinement	72.44	66.81	53.68	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
After Mitigation and Refinement	78.46	39.03	10.23	9.00	16.76	0.06	1.51	0.02	6,040.20	0.25	0.05	0.05
Change in Emissions	6.02	-27.78	-43.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[a] Emission totals are from *"Rosemont Copper Company, Application for a Class II Permit and Emission Inventory Information, Rosemont Copper Project, Southeastern Arizona"* submitted to ADEQ on November 15, 2011.

[b] Emission totals are from *"Rosemont Copper Company, Amendment to: Application for a Class II Permit and Emission Inventory Information, Rosemont Copper Project, Southeastern Arizona"* submitted to ADEQ on March 19, 2012.

Table G.2 Comparison of Fugitive Emissions from the RCP - Proposed Action

Emission Category	Fugitive Emissions (tpy)											
	PM/TSP	PM_{10}	$PM_{2.5}$	CO	NO_X	SO_2	VOC	H_2SO_4	CO_2	CH_4	N_2O	HAPs
Year 1												
Prior to Mitigation and Refinement [a]	2,851.09	785.29	87.92	635.83	161.33	18.98	3.77	0.00	5,375.60	0.22	0.04	3.32
After Mitigation and Refinement [b]	2,791.22	765.20	88.32	635.83	161.33	18.98	3.77	0.00	5,375.60	0.22	0.04	3.32
Change in Emissions	-59.87	-20.10	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 5												
Prior to Mitigation and Refinement	3,297.90	894.91	98.84	606.22	153.82	18.10	3.77	0.00	5,125.23	0.21	0.04	3.32
After Mitigation and Refinement	3,238.04	874.81	99.24	606.22	153.82	18.10	3.77	0.00	5,125.23	0.21	0.04	3.32
Change in Emissions	-59.87	-20.10	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 10												
Prior to Mitigation and Refinement	2,786.66	763.36	85.71	602.73	152.93	17.99	3.77	0.00	5,095.78	0.21	0.04	3.32
After Mitigation and Refinement	2,726.80	743.27	86.11	602.73	152.93	17.99	3.77	0.00	5,095.78	0.21	0.04	3.32
Change in Emissions	-59.87	-20.10	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 15												
Prior to Mitigation and Refinement	2,715.41	735.13	81.96	438.98	111.38	13.10	3.77	0.00	3,711.38	0.15	0.03	3.32
After Mitigation and Refinement	2,655.49	715.01	82.35	438.98	111.38	13.10	3.77	0.00	3,711.38	0.15	0.03	3.32
Change in Emissions	-59.92	-20.11	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year 20												
Prior to Mitigation and Refinement	1,586.52	428.87	48.00	175.94	44.64	5.25	3.77	0.00	1,487.50	0.06	0.01	3.32
After Mitigation and Refinement	1,526.67	408.78	48.40	175.94	44.64	5.25	3.77	0.00	1,487.50	0.06	0.01	3.32
Change in Emissions	-59.84	-20.09	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

[a] Emission totals are from *"Rosemont Copper Company, Application for a Class II Permit and Emission Inventory Information, Rosemont Copper Project, Southeastern Arizona"* submitted to ADEQ on November 15, 2011.

[b] Emission totals are from *"Rosemont Copper Company, Amendment to: Application for a Class II Permit and Emission Inventory Information, Rosemont Copper Project, Southeastern Arizona"* submitted to ADEQ on March 19, 2012.

Table G.3 Comparison of Tailpipe Emissions from the RCP - Proposed Action												
Emission Category	Tailpipe Emissions (tpy)											
	PM/TSP	PM_{10}	$PM_{2.5}$	CO	NO_X	SO_2	VOC	H_2SO_4	CO_2	CH_4	N_2O	HAPs
Year 1												
Prior to Mitigation and Refinement [a]	33.85	33.85	33.85	831.98	1,086.65	1.54	78.70	--	163,786.04	--	--	--
After Mitigation and Refinement [b]	29.40	29.40	29.40	831.98	1,016.69	1.54	72.84	--	163,786.04	--	--	--
Change in Emissions	-4.45	-4.45	-4.45	0.00	-69.96	0.00	-5.86	--	0.00	--	--	--
Year 5												
Prior to Mitigation and Refinement	33.84	33.84	33.84	829.16	1,086.32	1.54	78.55	--	163,247.91	--	--	--
After Mitigation and Refinement	29.39	29.39	29.39	829.16	1,016.36	1.54	72.69	--	163,247.91	--	--	--
Change in Emissions	-4.45	-4.45	-4.45	0.00	-69.96	0.00	-5.86	--	0.00	--	--	--
Year 10												
Prior to Mitigation and Refinement	33.84	33.84	33.84	829.36	1,086.35	1.54	78.56	--	163,285.50	--	--	--
After Mitigation and Refinement	29.39	29.39	29.39	829.36	1,016.38	1.54	72.70	--	163,285.50	--	--	--
Change in Emissions	-4.45	-4.45	-4.45	0.00	-69.96	0.00	-5.86	--	0.00	--	--	--
Year 15												
Prior to Mitigation and Refinement	33.83	33.83	33.83	826.39	1,086.00	1.54	78.40	--	162,718.15	--	--	--
After Mitigation and Refinement	29.38	29.38	29.38	826.39	1,016.04	1.54	72.54	--	162,718.15	--	--	--
Change in Emissions	-4.45	-4.45	-4.45	0.00	-69.96	0.00	-5.86	--	0.00	--	--	--
Year 20												
Prior to Mitigation and Refinement	33.59	33.59	33.59	795.06	1,068.97	1.54	76.71	--	156,725.16	--	--	--
After Mitigation and Refinement	29.14	29.14	29.14	795.06	999.01	1.54	70.85	--	156,725.16	--	--	--
Change in Emissions	-4.45	-4.45	-4.45	0.00	-69.96	0.00	-5.86	--	0.00	--	--	--

[a] Emission totals are from *"Rosemont Copper Company, Application for a Class II Permit and Emission Inventory Information, Rosemont Copper Project, Southeastern Arizona"* submitted to ADEQ on November 15, 2011.

[b] Emission totals are from *"Rosemont Copper Company, Amendment to: Application for a Class II Permit and Emission Inventory Information, Rosemont Copper Project, Southeastern Arizona"* submitted to ADEQ on March 19, 2012.

APPENDIX H

ADEQ COMMENTS TO MODELING PROTOCOL

Rosemont used the Tier 3 OLM approach for estimating the 1-hour NO_2 impacts from the proposed sources. There are two key model inputs under Tier 3 Options for the NO-to-NO2 conversion, namely background ozone concentrations and in-stack ratios of NO_2/NOx emissions. At the meeting dated March 20, 2012, ADEQ and JBR (the consultant for Rosemont) have initially discussed the selection of the ozone monitoring site, the methodology for filling in missing hourly ozone data, and the use of representative in-stack ratios for varied sources. The following additional discussions attempt to clarify the department's status regarding the two critical issues.

1. Ozone Data

Selection of Ozone Monitoring Site

JBR selected the Chiricahua National Monument, a "regional" site, for the ozone background data because "it is more representative of the Rosemont site due to similar terrain features, elevation, and remoteness from emission sources". In general, a "regional" site may be used only if there are no monitors located in the vicinity of the source (Appendix W Section 8.2.2). Moreover, it is not clear whether the surrounding area of Rosemont is free from the impacts of the sources within the Tucson Metro area, possibly due to the transport of ozone and its precursors.

The monitoring site nearest to Rosemont is Green Valley (AQS Site ID: 04-019-1030), which is located around 15 miles to the west of the project site. ADEQ has reviewed the monitoring data collected from both the Green Valley site and the Chiricahua site, and compared the two datasets with the same sampling period (Years 2006-2008). The results are shown in Figure 1. As indicated in Figure 1, the hourly maximum concentrations of the Chiricahua site are comparable or higher than that of the Green Valley site. Therefore, from the perspective of modeling, the use of the Chiricahua data may relatively overestimate the conversion of NO to NO_2 and thus provide a relative conservative estimation for the 1-hour NO_2 impacts from the proposed sources.

Based on the discussion above, ADEQ approves the use of Chiricahua data for hourly background ozone levels.

Methodology for Filling in Missing Hourly Ozone Data

As discussed in the letter from ADEQ to Rosemont dated Feb.29, 2012, ADEQ disagrees with the substitution for missing hourly ozone data by using annual average concentration, since the use of the annual average concentration may underestimate the ozone concentration for the missing hours, leading to the underestimation of the conversion of NO to NO_2. To be defensible, the potential maximum ozone concentrations for these specific missing hours should be estimated and input to the model.

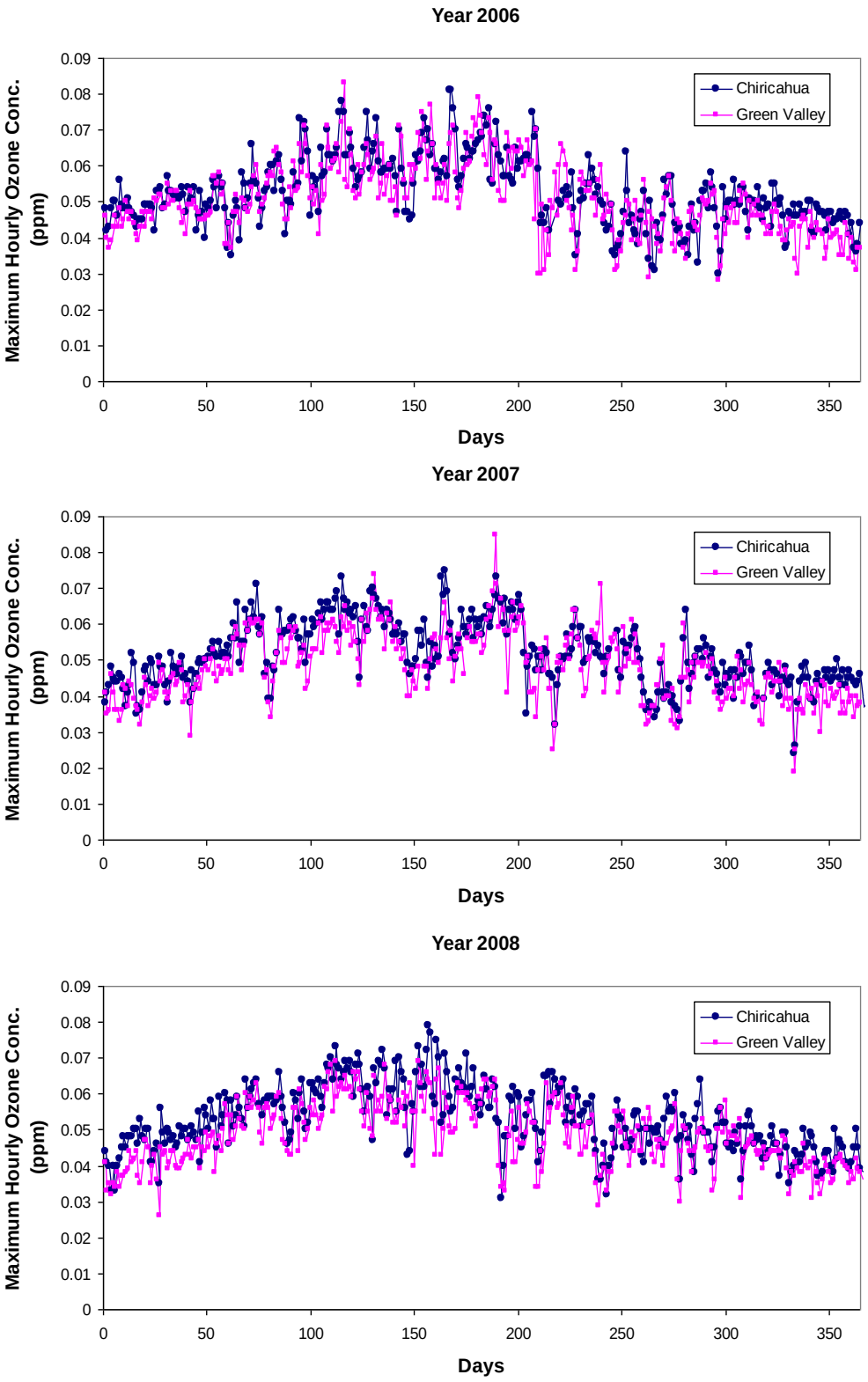


Figure 1 Hourly Maximum Ozone Concentrations for Chiricahua and Green Valley Sites

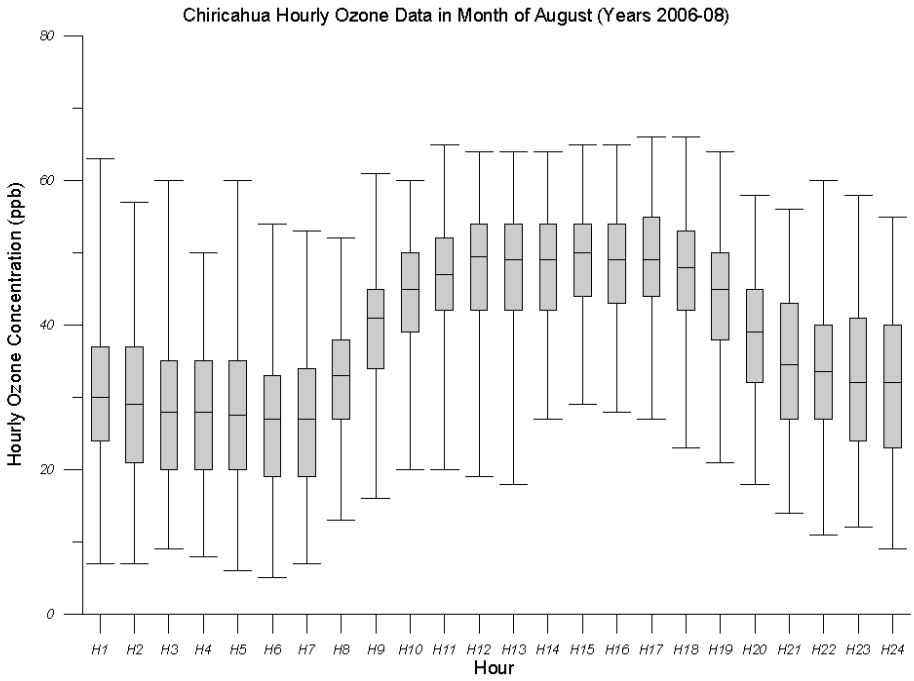
According to the hourly ozone data file JBR provided (OLM.csv), about 4 percent hourly ozone data were missing during the modeled period (April 1, 2006-March 31, 2009). In a typical data missing event, only a few consecutive hours of ambient ozone concentrations were missing. However, significant missing data periods (about 4-5 days) occurred at the Chiricahua site in August 2006 and November 2007. To estimate hourly ozone concentrations for these consecutive missing days, ADEQ has reviewed hourly ozone data collected in the months of August and November for Years 2006-2008. A statistical analysis was performed to summarize the ozone concentration for each diurnal hour. The results are shown in Figure 2. As presented, the ozone concentrations for each diurnal hour vary significantly under the same month, although the medium values show a typical ozone diurnal pattern. Apparently, it is a challenge to realistically estimate the missing hourly ozone data for these consecutive days.

ADEQ recommends the following procedures for filling in missing hourly ozone data:

- For the missing data period of August 3-8, 2006, use the maximum ozone concentrations for each diurnal hour that are determined based on the measurements in August (see the table below);
- For the missing data period of November 11-15, 2007, use the maximum ozone concentrations for each diurnal hour that are determined based on the measurements in November (see the table below);
- For other missing hours, use linear interpolations to fill in the missing concentrations based on the previous and subsequent hour concentrations or simply use the higher one.

Hour	Ozone in August (ppb)	Ozone in November (ppb)
1	63	55
2	57	54
3	60	53
4	50	52
5	60	52
6	54	51
7	53	51
8	52	50
9	61	51
10	60	52
11	65	54
12	64	55
13	64	53
14	64	53
15	65	54
16	65	54
17	66	54
18	66	54
19	64	51
20	58	52
21	56	54
22	60	55
23	58	55
24	55	55

If JBR would like to propose an alternative approach for the data substitution, please provide sufficient justification for the approach to be used.



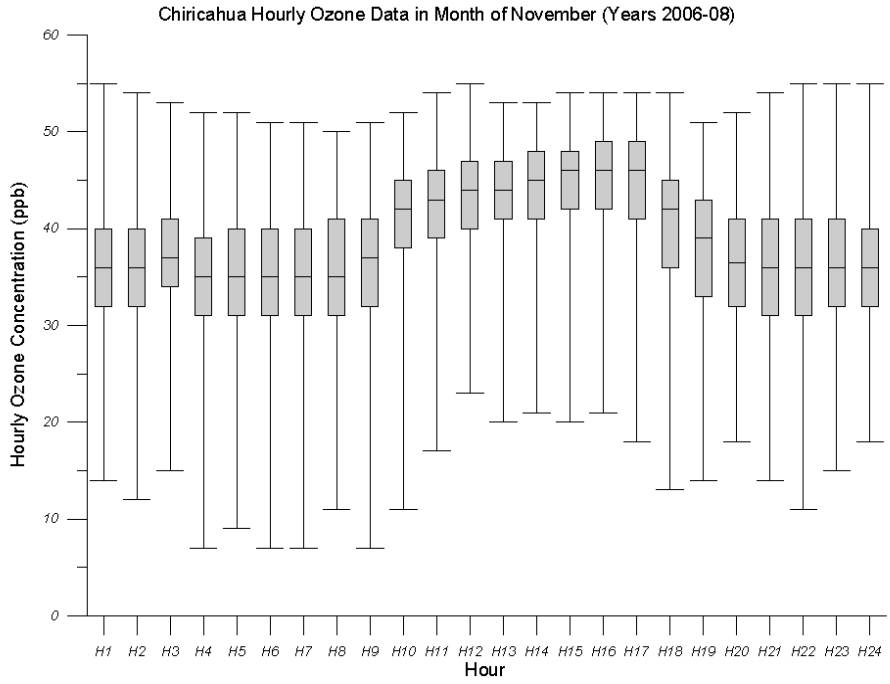


Figure 2 Chiricahua Hourly Ozone Concentrations in Months of August and November

2. In-stack ratios of NO_2/NOx emissions

In the letter from ADEQ to Rosemont dated Feb.29, 2012, ADEQ requested additional justification for using an in-stack ratio of 0.05 for emissions from natural gas-fired heaters as well as the blasting. At the meeting dated March 20, 2012, JBR provided some actual in-stack measurements for gas-fired heaters and justified that a ratio of 0.05 was relatively conservative than the testing data. Regarding the blasting sources, JBR argued that the contribution of the blasting sources to the modeled impacts was insignificant. However, this argument did not provide justification why a ratio of 0.05 was appropriate for modeling the blasting sources. Since no comparable test data exist for blasting emissions, the use of a ratio of 0.05 was arbitrarily and the modeling methodology was not defensible.

In the EPA's memorandum dated on March 1, 2011, a default in-stack ratio of 0.5 is recommended in absence of more appropriate source specific information in a Tier 3 PVMRM/OLM analysis:

"We recommend …0.50 as a default in-stack ratio of NO2/NOx for input to the PVMRM and OLM options within AERMOD, in the absence of more appropriate source-specific information on in-stack ratios."

Due to the absence of source-specific in-stack ratios, ADEQ recommends a default in-stack ratio of 0.5 for modeling blasting sources.

APPENDIX I

MODELING SOURCE PARAMETERS

Table I.1 Year 1- Modeling Hourly Emissions - Point Sources													
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Stack Height (ft)**	**Temperature (°F)**	**Exit Velocity (fps)**	**Stack Diameter (ft)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PCL01	Crushing Area Scrubber (100-DC-001)	524076.4	3521780.6	1540.4	22.68	100.00	0.001	2.90	0.6400	-	-	-	0.1182
PCL02	Stockpile Area Scrubber (150-DC-001)	523855.4	3522544.9	1559.1	22.05	100.00	21.529	3.72	1.4700	-	-	-	0.2226
PCL03	Reclaim Tunnel Scrubber (200-DC-001)	523862.1	3522669.4	1550.8	18.67	100.00	0.001	1.81	0.3600	-	-	-	0.0545
PCL04	Pebble Crusher Area Scrubber	523898.7	3522876.4	1544.7	18.61	100.00	0.001	1.77	0.3200	-	-	-	0.0591
PCL05	Copper Concentrate Scrubber 1	524033.0	3522992.6	1533.8	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL06	Copper Concentrate Scrubber 2	524043.8	3522990.6	1530.1	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL07	Moly Scrubber/Electrostatic Precipitator	524114.0	3522935.8	1524.6	55.00	500.00	10.620	1.00	0.0140	-	-	-	0.0132
PCL08	Moly Dust Collector (510-DC-001)	524034.0	3522999.3	1534.2	6.27	100.00	0.001	0.90	0.0530	-	-	-	0.0080
PCL09	Dust Collector, model DFO-4-16, Donaldson	523991.4	3522567.9	1549.3	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL10	Dust Collector, model DFO-4-16, Donaldson	524009.6	3522566.4	1547.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL11	Dust Collector, model DFO-4-16, Donaldson	524029.4	3522565.1	1543.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL12	SAG Feed Conveyor Dust Collector (200-DC-001)	523900.7	3522872.5	1543.5	18.71	100.00	0.001	1.90	0.4600	-	-	-	0.0697
FB01	Diesel Electrowinning Hot water Generator	524241.0	3522386.3	1524.9	12.00	1000.00	130.200	0.30	0.1007	0.2190	0.8759	0.0093	0.0674
Total									**8.0436**	**0.2190**	**0.8759**	**0.0093**	**1.6757**

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
BLST1	Blasting	522517.6	3521978.6	1571.8	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST2	Blasting	522753.4	3521978.6	1571.8	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST3	Blasting	522510.1	3521788.4	1571.8	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST5	Blasting	522510.1	3521575.4	1571.8	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST4	Blasting	522751.3	3521784.1	1571.8	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST6	Blasting	522751.3	3521576.3	1571.8	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
UNLP1	Unload to Leachpad #1	524514.4	3520933.6	1515.6	6.50	4.00	6.05	0.24721	0.54146	0.81504	0.00101	0.05842
UNLP2	Unload to Leachpad #2	524523.9	3520721.4	1535.6	6.50	4.00	6.05	0.24721	0.54146	0.81504	0.00101	0.05842
UNLP3	Unload to Leachpad #3	524255.1	3520716.6	1551.3	6.50	4.00	6.05	0.24721	0.54146	0.81504	0.00101	0.05842
UNLP4	Unload to Leachpad #4	524250.4	3520933.6	1537.3	6.50	4.00	6.05	0.24721	0.54146	0.81504	0.00101	0.05842
UNLP5	Unload to Leachpad #5	523740.9	3520754.4	1566.0	6.50	4.00	6.05	0.24721	0.54146	0.81504	0.00101	0.05842
UNLP6	Unload to Leachpad #6	523783.4	3520523.1	1576.0	6.50	4.00	6.05	0.24721	0.54146	0.81504	0.00101	0.05842
UNSUL1	Unload to Sulfide Stockpile #1	523945.9	3521709.9	1531.4	6.50	4.00	6.05	0.37016	0.54146	0.81504	0.00101	0.07704
UNSUL2	Unload to Sulfide Stockpile #2	523878.1	3521730.1	1533.1	6.50	4.00	6.05	0.37016	0.54146	0.81504	0.00101	0.07704
UNSUL3	Unload to Sulfide Stockpile #3	523906.1	3521805.9	1545.0	6.50	4.00	6.05	0.37016	0.54146	0.81504	0.00101	0.07704
UNSUL4	Unload to Sulfide Stockpile #4	523963.4	3521788.6	1549.9	6.50	4.00	6.05	0.37016	0.54146	0.81504	0.00101	0.07704
PC01	Wind Erosion from Sulfide ore Stockpile	523924.1	3521760.1	1539.0	6.00	74.00	5.60	0.62003	-	-	-	0.09300
PC02	Primary Crusher	524077.9	3521773.9	1540.4	0.00	1.91	1.40	0.68359	-	-	-	0.10352
MD04	Moly Concentrate Bin to Hopper	524033.8	3522982.3	1532.8	3.00	0.47	0.70	0.00030	-	-	-	0.00004
TDS04	Fixed Tailings Conveyor 2 to Fixed Tailings Conveyor 3	524603.0	3522350.1	1511.5	3.00	0.47	0.70	0.12413	-	-	-	0.01880
TDS05	Fixed Tailings Conveyor 3 to Relocatable Conveyor	524801.3	3522465.1	1523.9	3.00	0.47	0.70	0.12413	-	-	-	0.01880
TDS06	Relocatable Conveyor to Shiftable Conveyor	524824.4	3522475.9	1522.2	3.00	0.47	0.70	0.12413	-	-	-	0.01880
TDS07	Shiftable Conveyor to Belt Wagon Conveyor	524903.9	3522511.6	1507.3	3.00	0.47	0.70	0.94712	-	-	-	0.14342
TDS08	Belt Wagon Conveyor to Spreader Crwaler Mounted Conveyor	524973.1	3522545.4	1492.7	3.00	0.47	0.70	0.94712	-	-	-	0.14342
TDS09	Spreader Crawler Mounted Conveyor to Tailings Storage	525053.9	3522581.1	1483.6	3.00	0.47	0.70	0.94712	-	-	-	0.14342
TDS10	Wind Erosion from Tailings Storage	525098.2	3522631.3	1476.5	6.00	573.00	5.60	3.45085	-	-	-	0.51763

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
MS01	Transfer of Bulk Pebble Lime to the Bulk Pebble Lime Silo	523891.5	3522885.84	1546.6	3.00	0.47	0.70	0.22409	-	-	-	0.03393
MS04	Pneumatic Lime Transfer From Truck to Lime Storage Bin (800-BN-801)	524078.69	3522861.62	1523.04	3.00	0.47	0.70	0.62137	-	-	-	0.62137
MS0506	Transfer of Flocculant from Supersacks to Flocculant Storage Bin	524123.4	3522869.4	1523.7	3.00	0.47	0.70	0.00075	-	-	-	0.00011
MS0708	Transfer of Guar from Bags to Guar Feeder (F-Gu) and Transfer of Granular Cobalt Sulfate from Bags to Cobalt	524198.0	3522368.1	1522.6	3.00	0.47	0.70	0.00008	-	-	-	0.00001
HAUL1	Haul Roads	522470.4	3521193.0	1677.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL2	Haul Roads	522484.4	3521156.3	1673.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL3	Haul Roads	522498.6	3521120.5	1685.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL4	Haul Roads	522512.4	3521084.3	1678.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL5	Haul Roads	522525.9	3521047.5	1671.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL6	Haul Roads	522540.4	3521011.3	1668.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL7	Haul Roads	522554.1	3520974.8	1669.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL8	Haul Roads	522567.9	3520938.3	1665.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL9	Haul Roads	522582.1	3520902.5	1656.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL10	Haul Roads	522595.6	3520866.0	1650.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL11	Haul Roads	522610.1	3520829.0	1651.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL12	Haul Roads	522634.4	3520799.3	1670.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL13	Haul Roads	522668.9	3520782.8	1674.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL14	Haul Roads	522706.1	3520770.3	1667.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL15	Haul Roads	522743.1	3520757.3	1657.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL16	Haul Roads	522780.4	3520744.5	1641.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL17	Haul Roads	522811.6	3520720.0	1632.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL18	Haul Roads	522842.9	3520695.8	1628.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL19	Haul Roads	522873.4	3520670.5	1621.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL20	Haul Roads	522905.1	3520649.3	1613.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL21	Haul Roads	522942.4	3520640.5	1606.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL22	Haul Roads	522980.6	3520634.0	1599.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL23	Haul Roads	523019.9	3520627.3	1609.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL24	Haul Roads	523058.1	3520621.3	1616.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL25	Haul Roads	523095.4	3520629.3	1610.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL26	Haul Roads	523131.9	3520643.0	1622.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL27	Haul Roads	523168.4	3520656.8	1616.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL28	Haul Roads	523205.4	3520670.3	1606.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL29	Haul Roads	523241.4	3520684.0	1596.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL30	Haul Roads	523277.9	3520697.8	1598.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL31	Haul Roads	523314.1	3520711.3	1601.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL32	Haul Roads	523350.9	3520724.8	1599.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL33	Haul Roads	523387.4	3520738.5	1591.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL34	Haul Roads	523424.4	3520752.3	1586.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL35	Haul Roads	523457.9	3520772.3	1583.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL36	Haul Roads	523492.1	3520790.8	1575.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL37	Haul Roads	523525.9	3520809.0	1571.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL38	Haul Roads	523560.6	3520827.8	1564.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL39	Haul Roads	523594.9	3520847.0	1570.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL40	Haul Roads	523628.4	3520868.3	1572.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL41	Haul Roads	523662.4	3520888.5	1574.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL42	Haul Roads	523696.6	3520907.8	1577.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL43	Haul Roads	523730.4	3520926.5	1573.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL44	Haul Roads	523765.1	3520945.0	1567.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL45	Haul Roads	523798.6	3520964.3	1563.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL46	Haul Roads	523833.1	3520983.0	1551.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL47	Haul Roads	523866.6	3521002.3	1549.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL48	Haul Roads	523901.1	3521021.3	1550.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL49	Haul Roads	523920.1	3520986.0	1550.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL50	Haul Roads	523931.4	3520947.5	1550.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL51	Haul Roads	523941.9	3520910.8	1561.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL52	Haul Roads	523952.6	3520873.0	1563.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL53	Haul Roads	523963.1	3520834.8	1562.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL54	Haul Roads	523973.4	3520797.5	1562.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL55	Haul Roads	523983.9	3520760.5	1571.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL56	Haul Roads	523995.4	3520722.3	1575.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL57	Haul Roads	524006.4	3520684.0	1570.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL58	Haul Roads	524023.9	3520649.3	1567.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL59	Haul Roads	524042.1	3520613.5	1564.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL60	Haul Roads	524061.1	3520580.3	1553.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL61	Haul Roads	524079.4	3520545.3	1553.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL62	Haul Roads	524098.9	3520511.3	1563.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL63	Haul Roads	524116.6	3520475.3	1565.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL64	Haul Roads	524134.1	3520441.0	1570.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL65	Haul Roads	524149.4	3520404.3	1561.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL66	Haul Roads	524164.9	3520368.5	1552.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL67	Haul Roads	524182.4	3520335.0	1544.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL68	Haul Roads	524199.6	3520300.0	1549.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL69	Haul Roads	523908.1	3521059.5	1549.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL70	Haul Roads	523915.4	3521097.5	1550.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL71	Haul Roads	523926.4	3521135.8	1553.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL72	Haul Roads	523940.4	3521171.5	1545.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL73	Haul Roads	523952.9	3521209.3	1539.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL74	Haul Roads	523965.9	3521245.8	1538.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL75	Haul Roads	523977.9	3521282.5	1536.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL76	Haul Roads	523991.6	3521319.0	1535.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL77	Haul Roads	524004.1	3521355.5	1542.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL78	Haul Roads	524037.1	3521331.8	1538.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL79	Haul Roads	524062.9	3521304.0	1534.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL80	Haul Roads	524087.4	3521275.5	1534.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL81	Haul Roads	524113.9	3521245.5	1543.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL82	Haul Roads	524142.4	3521218.8	1545.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL83	Haul Roads	524010.1	3521393.3	1550.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL84	Haul Roads	524017.4	3521431.8	1547.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL85	Haul Roads	524023.9	3521470.8	1546.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL86	Haul Roads	524030.6	3521509.5	1550.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL87	Haul Roads	524036.9	3521547.0	1544.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL88	Haul Roads	524048.1	3521583.8	1522.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL89	Haul Roads	524060.4	3521621.5	1519.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL90	Haul Roads	524072.1	3521659.5	1521.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL91	Haul Roads	524083.9	3521697.0	1525.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL92	Haul Roads	524095.9	3521733.3	1535.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL93	Haul Roads	524131.6	3521699.0	1524.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL94	Haul Roads	524168.1	3521714.5	1520.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL95	Haul Roads	524202.4	3521732.3	1521.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL96	Haul Roads	524236.4	3521753.3	1516.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL97	Haul Roads	524258.4	3521785.5	1511.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL98	Haul Roads	524279.4	3521819.8	1508.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL99	Haul Roads	524298.9	3521853.3	1511.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL100	Haul Roads	524318.6	3521888.8	1511.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL101	Haul Roads	522485.1	3521197.5	1673.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL102	Haul Roads	522499.4	3521161.8	1668.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL103	Haul Roads	522514.4	3521125.5	1678.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL104	Haul Roads	522528.9	3521090.5	1674.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL105	Haul Roads	522542.6	3521052.5	1664.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL106	Haul Roads	522556.4	3521016.5	1662.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL107	Haul Roads	522570.6	3520979.3	1664.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL108	Haul Roads	522585.1	3520944.3	1661.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL109	Haul Roads	522598.1	3520908.0	1654.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL110	Haul Roads	522613.1	3520872.0	1645.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL111	Haul Roads	522626.4	3520834.3	1648.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL112	Haul Roads	522639.6	3520810.8	1665.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL113	Haul Roads	522676.1	3520797.8	1667.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL114	Haul Roads	522713.4	3520785.5	1661.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL115	Haul Roads	522749.9	3520773.5	1652.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL116	Haul Roads	522786.6	3520760.5	1639.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL117	Haul Roads	522819.9	3520734.8	1625.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL118	Haul Roads	522850.9	3520710.3	1625.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL119	Haul Roads	522881.4	3520686.5	1620.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL120	Haul Roads	522911.9	3520662.3	1613.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL121	Haul Roads	522944.6	3520654.0	1606.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL122	Haul Roads	522982.6	3520647.3	1598.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL123	Haul Roads	523021.1	3520641.0	1600.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL124	Haul Roads	523059.9	3520634.3	1614.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL125	Haul Roads	523088.6	3520643.8	1608.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL126	Haul Roads	523125.9	3520656.8	1618.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL127	Haul Roads	523162.1	3520672.0	1615.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL128	Haul Roads	523197.9	3520684.8	1606.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL129	Haul Roads	523234.9	3520698.5	1596.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL130	Haul Roads	523270.9	3520712.8	1591.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL131	Haul Roads	523308.9	3520725.8	1597.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL132	Haul Roads	523345.4	3520739.0	1599.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL133	Haul Roads	523382.4	3520753.3	1594.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL134	Haul Roads	523418.1	3520766.8	1588.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL135	Haul Roads	523452.4	3520786.5	1582.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL136	Haul Roads	523486.6	3520805.8	1573.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL137	Haul Roads	523520.1	3520824.5	1569.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL138	Haul Roads	523554.6	3520843.0	1567.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL139	Haul Roads	523585.1	3520865.8	1576.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL140	Haul Roads	523617.6	3520889.3	1578.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL141	Haul Roads	523649.1	3520910.8	1577.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL142	Haul Roads	523681.6	3520932.3	1575.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL143	Haul Roads	523714.1	3520954.8	1570.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL144	Haul Roads	523745.6	3520977.5	1565.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL145	Haul Roads	523779.1	3520998.8	1559.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL146	Haul Roads	523811.9	3521018.3	1555.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL147	Haul Roads	523845.4	3521038.8	1549.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL148	Haul Roads	523879.4	3521059.5	1548.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL149	Haul Roads	523942.9	3520992.8	1554.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL150	Haul Roads	523953.6	3520954.8	1559.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL151	Haul Roads	523964.9	3520916.8	1564.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL152	Haul Roads	523974.9	3520878.8	1565.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL153	Haul Roads	523986.1	3520841.5	1567.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL154	Haul Roads	523996.9	3520803.5	1568.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL155	Haul Roads	524007.4	3520767.0	1574.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL156	Haul Roads	524018.4	3520729.0	1573.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL157	Haul Roads	524028.6	3520691.3	1561.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL158	Haul Roads	524046.4	3520657.8	1563.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL159	Haul Roads	524065.1	3520623.8	1559.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL160	Haul Roads	524083.6	3520587.8	1552.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL161	Haul Roads	524102.4	3520554.3	1550.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL162	Haul Roads	524119.9	3520519.0	1560.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL163	Haul Roads	524137.4	3520484.8	1562.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL164	Haul Roads	524155.6	3520449.8	1565.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL165	Haul Roads	524173.9	3520415.0	1563.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL166	Haul Roads	524189.6	3520379.3	1555.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL167	Haul Roads	524207.4	3520345.3	1543.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL168	Haul Roads	524224.9	3520309.8	1543.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL169	Haul Roads	523893.1	3521097.5	1547.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL170	Haul Roads	523907.9	3521134.0	1549.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL171	Haul Roads	523921.1	3521171.3	1543.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL172	Haul Roads	523933.1	3521207.3	1537.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL173	Haul Roads	523947.1	3521243.5	1538.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL174	Haul Roads	523959.9	3521280.8	1536.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL175	Haul Roads	523973.1	3521317.3	1536.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL176	Haul Roads	523986.9	3521353.5	1541.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL177	Haul Roads	524027.9	3521374.8	1547.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL178	Haul Roads	524052.1	3521343.8	1538.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL179	Haul Roads	524076.6	3521313.3	1534.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL180	Haul Roads	524101.1	3521284.5	1534.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL181	Haul Roads	524127.1	3521254.8	1538.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL182	Haul Roads	524152.4	3521228.5	1542.5	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL183	Haul Roads	523992.4	3521394.0	1551.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL184	Haul Roads	523998.6	3521433.5	1550.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL185	Haul Roads	524006.1	3521471.3	1547.6	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL186	Haul Roads	524012.9	3521509.5	1551.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL187	Haul Roads	524020.4	3521547.8	1540.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL188	Haul Roads	524027.6	3521587.0	1520.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL189	Haul Roads	524036.4	3521625.5	1523.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL190	Haul Roads	524045.9	3521663.8	1522.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL191	Haul Roads	524056.1	3521701.0	1528.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL192	Haul Roads	524066.1	3521740.3	1536.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL193	Haul Roads	524127.6	3521706.3	1525.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL194	Haul Roads	524161.6	3521724.5	1523.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL195	Haul Roads	524196.9	3521741.8	1523.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL196	Haul Roads	524229.1	3521763.3	1519.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL197	Haul Roads	524247.4	3521790.8	1513.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL198	Haul Roads	524266.9	3521825.5	1509.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL199	Haul Roads	524287.4	3521857.8	1508.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL200	Haul Roads	524307.1	3521892.3	1508.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL201	Haul Roads	524014.6	3520885.0	1565.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL202	Haul Roads	524052.6	3520892.0	1560.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL203	Haul Roads	524091.6	3520898.5	1557.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL204	Haul Roads	524129.4	3520905.8	1554.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL205	Haul Roads	524168.1	3520911.8	1550.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL206	Haul Roads	524207.1	3520916.8	1542.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL207	Haul Roads	524216.9	3520704.8	1560.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL208	Haul Roads	524179.6	3520694.5	1564.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL209	Haul Roads	524141.6	3520683.3	1559.1	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL210	Haul Roads	524105.4	3520671.0	1552.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL211	Haul Roads	523923.1	3520819.0	1558.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL212	Haul Roads	523886.6	3520805.3	1559.4	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL213	Haul Roads	523850.1	3520792.0	1562.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL214	Haul Roads	523814.4	3520778.3	1565.0	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL215	Haul Roads	523777.4	3520764.8	1564.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL216	Haul Roads	523972.1	3520660.8	1577.2	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL217	Haul Roads	523941.9	3520637.8	1574.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL218	Haul Roads	523910.9	3520614.8	1566.3	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL219	Haul Roads	523878.6	3520590.8	1565.8	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL220	Haul Roads	523846.9	3520568.0	1571.7	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
HAUL221	Haul Roads	523814.4	3520544.3	1573.9	6.50	16.28	6.05	0.57508	0.54146	0.81504	0.00101	0.07977
UNWD1	Unload to Waste Dump #1	524113.6	3520254.4	1569.7	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD2	Unload to Waste Dump #2	524188.9	3520117.6	1553.1	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD3	Unload to Waste Dump #3	524240.9	3519971.6	1539.4	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD4	Unload to Waste Dump #4	523967.4	3520212.1	1586.5	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD5	Unload to Waste Dump #5	524028.6	3520056.4	1552.1	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD6	Unload to Waste Dump #6	524094.6	3519896.1	1576.4	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD7	Unload to Waste Dump #7	523882.4	3519999.9	1586.9	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD8	Unload to Waste Dump #8	523948.4	3519844.1	1548.7	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD9	Unload to Waste Dump #9	523788.1	3519792.4	1589.2	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
UNWD10	Unload to Waste Dump #10	523637.1	3519872.4	1582.1	6.50	4.00	6.05	0.49311	0.54146	0.81504	0.00101	0.09566
PAV1	Paved Facility Roads	524089.4	3522132.2	1517.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV2	Paved Facility Roads	524061.6	3522148.0	1525.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV3	Paved Facility Roads	524038.6	3522169.1	1525.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV4	Paved Facility Roads	524022.0	3522196.2	1524.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV5	Paved Facility Roads	524011.0	3522226.3	1524.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV6	Paved Facility Roads	524000.1	3522256.4	1525.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV7	Paved Facility Roads	523991.2	3522287.0	1531.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV8	Paved Facility Roads	523986.0	3522318.5	1536.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV9	Paved Facility Roads	523980.7	3522350.1	1541.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV10	Paved Facility Roads	523975.4	3522381.7	1539.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV11	Paved Facility Roads	523970.2	3522413.2	1540.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV12	Paved Facility Roads	523964.9	3522444.8	1547.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV13	Paved Facility Roads	523959.6	3522476.4	1546.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV14	Paved Facility Roads	523954.3	3522507.9	1549.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV15	Paved Facility Roads	523952.1	3522539.7	1551.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV16	Paved Facility Roads	523953.8	3522571.6	1552.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV17	Paved Facility Roads	523955.4	3522603.6	1548.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV18	Paved Facility Roads	523957.0	3522635.5	1540.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV19	Paved Facility Roads	523958.7	3522667.5	1546.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV20	Paved Facility Roads	523960.3	3522699.4	1550.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV21	Paved Facility Roads	523962.0	3522731.4	1553.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV22	Paved Facility Roads	523968.0	3522762.8	1543.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV23	Paved Facility Roads	523974.1	3522794.2	1534.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV24	Paved Facility Roads	523974.9	3522826.2	1531.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV25	Paved Facility Roads	523974.9	3522858.2	1537.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV26	Paved Facility Roads	523969.9	3522889.8	1536.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV27	Paved Facility Roads	523964.8	3522921.4	1537.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV28	Paved Facility Roads	523959.7	3522953.0	1535.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV29	Paved Facility Roads	523948.2	3522982.7	1545.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV30	Paved Facility Roads	523948.5	3523013.3	1551.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV31	Paved Facility Roads	523961.7	3523040.3	1546.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV32	Paved Facility Roads	523989.2	3523056.5	1536.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV33	Paved Facility Roads	524021.2	3523056.5	1532.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV34	Paved Facility Roads	524047.1	3523039.7	1524.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV35	Paved Facility Roads	524071.7	3523019.3	1525.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV36	Paved Facility Roads	524097.4	3523000.1	1522.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV37	Paved Facility Roads	524125.1	3522984.9	1521.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV38	Paved Facility Roads	524155.6	3522975.3	1516.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV39	Paved Facility Roads	524187.2	3522971.5	1514.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV40	Paved Facility Roads	524218.9	3522973.3	1512.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV41	Paved Facility Roads	524250.5	3522978.4	1508.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV42	Paved Facility Roads	524282.3	3522982.1	1505.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV43	Paved Facility Roads	524314.2	3522984.3	1503.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV44	Paved Facility Roads	524346.1	3522986.2	1504.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV45	Paved Facility Roads	524378.1	3522986.2	1506.6	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV46	Paved Facility Roads	524410.1	3522986.3	1508.0	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV47	Paved Facility Roads	524440.9	3522993.0	1517.5	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV48	Paved Facility Roads	524468.8	3523008.7	1526.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV49	Paved Facility Roads	524496.7	3523024.4	1514.6	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV50	Paved Facility Roads	524514.7	3523050.6	1498.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV51	Paved Facility Roads	524532.0	3523077.5	1510.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV52	Paved Facility Roads	524538.9	3523108.8	1520.4	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV53	Paved Facility Roads	524545.8	3523140.0	1527.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV54	Paved Facility Roads	524552.7	3523171.2	1527.0	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV55	Paved Facility Roads	524559.6	3523202.5	1512.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV56	Paved Facility Roads	524564.9	3523234.0	1513.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV57	Paved Facility Roads	524569.8	3523265.7	1522.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV58	Paved Facility Roads	524574.8	3523297.3	1526.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV59	Paved Facility Roads	524579.8	3523328.9	1513.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV60	Paved Facility Roads	524584.8	3523360.5	1507.2	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV61	Paved Facility Roads	524589.7	3523392.1	1502.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV62	Paved Facility Roads	524594.7	3523423.7	1517.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV63	Paved Facility Roads	524608.6	3523450.8	1514.8	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV64	Paved Facility Roads	524631.1	3523473.6	1511.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV65	Paved Facility Roads	524653.5	3523496.4	1507.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV66	Paved Facility Roads	524676.0	3523519.2	1498.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV67	Paved Facility Roads	524698.5	3523542.0	1489.2	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV68	Paved Facility Roads	524720.9	3523564.8	1490.9	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV69	Paved Facility Roads	524743.4	3523587.5	1503.9	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV70	Paved Facility Roads	523985.4	3522376.7	1538.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV71	Paved Facility Roads	524016.8	3522370.7	1536.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV72	Paved Facility Roads	524047.2	3522360.7	1533.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV73	Paved Facility Roads	524077.6	3522350.7	1528.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV74	Paved Facility Roads	524108.0	3522340.7	1524.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV75	Paved Facility Roads	524138.4	3522330.7	1523.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV76	Paved Facility Roads	524147.9	3522351.2	1523.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV77	Paved Facility Roads	524149.6	3522383.2	1525.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV78	Paved Facility Roads	524151.4	3522415.1	1530.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV79	Paved Facility Roads	524181.3	3522409.5	1524.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159

Table I.2 Year 1- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV80	Paved Facility Roads	524211.3	3522398.4	1526.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV81	Paved Facility Roads	524275.7	3522970.0	1505.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV82	Paved Facility Roads	524286.5	3522939.8	1504.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV83	Paved Facility Roads	524297.3	3522909.7	1508.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV84	Paved Facility Roads	524308.1	3522879.6	1511.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV85	Paved Facility Roads	524318.9	3522849.5	1513.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV86	Paved Facility Roads	524329.7	3522819.4	1512.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV87	Paved Facility Roads	524343.1	3522790.4	1509.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV88	Paved Facility Roads	524358.0	3522762.0	1513.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV89	Paved Facility Roads	524370.4	3522732.8	1516.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV90	Paved Facility Roads	524371.4	3522701.2	1512.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV91	Paved Facility Roads	524364.8	3522670.2	1521.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV92	Paved Facility Roads	524349.5	3522642.4	1532.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV93	Paved Facility Roads	524333.9	3522614.6	1537.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV94	Paved Facility Roads	524324.6	3522584.0	1526.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV95	Paved Facility Roads	524315.2	3522553.4	1520.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV96	Paved Facility Roads	524310.4	3522538.0	1519.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV97	Paved Facility Roads	524059.7	3522944.2	1528.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV98	Paved Facility Roads	524039.3	3522919.5	1525.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV99	Paved Facility Roads	524052.8	3522904.5	1523.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV100	Paved Facility Roads	524084.3	3522909.3	1523.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV101	Paved Facility Roads	524116.3	3522907.9	1517.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV102	Paved Facility Roads	524148.3	3522906.5	1512.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV103	Paved Facility Roads	524180.1	3522908.4	1511.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV104	Paved Facility Roads	524210.5	3522917.1	1511.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV105	Paved Facility Roads	524229.7	3522941.3	1511.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV106	Paved Facility Roads	524232.7	3522964.0	1511.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
Total								**324.42**	**3639.51**	**1087.50**	**104.87**	**33.53**

Table I.3 Year 1 - Modeling Hourly Emissions - Open Pit Source														
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Easterly Length (m)**	**Northerly Length (m)**	**Pit Volume (m^3)**	**Angle from North**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PIT	Open Pit Mine	522319.88	3521271.1	1695.7	0.00	700.00	1000.00	173532000	0	59.99333	76.19077	89.82714	0.12594	10.02959

Table I.4 Year 1- Modeling Annual Emissions - Point Sources													
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Stack Height (ft)**	**Temperature (°F)**	**Exit Velocity (fps)**	**Stack Diameter (ft)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PCL01	Crushing Area Scrubber (100-DC-001)	524076.4	3521780.6	1540.4	22.68	100.00	0.001	2.90	0.6400	-	-	-	0.1182
PCL02	Stockpile Area Scrubber (150-DC-001)	523855.4	3522544.9	1559.1	22.05	100.00	21.529	3.72	1.4700	-	-	-	0.2226
PCL03	Reclaim Tunnel Scrubber (200-DC-001)	523862.1	3522669.4	1550.8	18.67	100.00	0.001	1.81	0.3600	-	-	-	0.0545
PCL04	Pebble Crusher Area Scrubber	523898.7	3522876.4	1544.7	18.61	100.00	0.001	1.77	0.3200	-	-	-	0.0591
PCL05	Copper Concentrate Scrubber 1	524033.0	3522992.6	1533.8	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL06	Copper Concentrate Scrubber 2	524043.8	3522990.6	1530.1	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL07	Moly Scrubber/Electrostatic Precipitator	524114.0	3522935.8	1524.6	55.00	500.00	10.620	1.00	0.0140	-	-	-	0.0132
PCL08	Moly Dust Collector (510-DC-001)	524034.0	3522999.3	1534.2	6.27	100.00	0.001	0.90	0.0530	-	-	-	0.0080
PCL09	Dust Collector, model DFO-4-16, Donaldson	523991.4	3522567.9	1549.3	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL10	Dust Collector, model DFO-4-16, Donaldson	524009.6	3522566.4	1547.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL11	Dust Collector, model DFO-4-16, Donaldson	524029.4	3522565.1	1543.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL12	SAG Feed Conveyor Dust Collector (200-DC-001)	523900.7	3522872.5	1543.5	18.71	100.00	0.001	1.90	0.4600	-	-	-	0.0697
FB01	Diesel Electrowinning Hot water Generator	524241.0	3522386.3	1524.9	12.00	1000.00	130.200	0.30	0.1007	-	0.8759	0.0093	0.0674
Total									**8.0436**	**-**	**0.8759**	**0.0093**	**1.6757**

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
BLST1	Blasting	522517.6	3521978.6	1571.8	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST2	Blasting	522753.4	3521978.6	1571.8	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST3	Blasting	522510.1	3521788.4	1571.8	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST5	Blasting	522510.1	3521575.4	1571.8	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST4	Blasting	522751.3	3521784.1	1571.8	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST6	Blasting	522751.3	3521576.3	1571.8	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
UNLP1	Unload to Leachpad #1	524514.4	3520933.6	1515.6	6.50	4.00	6.05	0.24173	-	0.63608	0.00079	0.05294
UNLP2	Unload to Leachpad #2	524523.9	3520721.4	1535.6	6.50	4.00	6.05	0.24173	-	0.63608	0.00079	0.05294
UNLP3	Unload to Leachpad #3	524255.1	3520716.6	1551.3	6.50	4.00	6.05	0.24173	-	0.63608	0.00079	0.05294
UNLP4	Unload to Leachpad #4	524250.4	3520933.6	1537.3	6.50	4.00	6.05	0.24173	-	0.63608	0.00079	0.05294
UNLP5	Unload to Leachpad #5	523740.9	3520754.4	1566.0	6.50	4.00	6.05	0.24173	-	0.63608	0.00079	0.05294
UNLP6	Unload to Leachpad #6	523783.4	3520523.1	1576.0	6.50	4.00	6.05	0.24173	-	0.63608	0.00079	0.05294
UNSUL1	Unload to Sulfide Stockpile #1	523945.9	3521709.9	1531.4	6.50	4.00	6.05	0.05379	-	0.63608	0.00079	0.02448
UNSUL2	Unload to Sulfide Stockpile #2	523878.1	3521730.1	1533.1	6.50	4.00	6.05	0.05379	-	0.63608	0.00079	0.02448
UNSUL3	Unload to Sulfide Stockpile #3	523906.1	3521805.9	1545.0	6.50	4.00	6.05	0.05379	-	0.63608	0.00079	0.02448
UNSUL4	Unload to Sulfide Stockpile #4	523963.4	3521788.6	1549.9	6.50	4.00	6.05	0.05379	-	0.63608	0.00079	0.02448
PC01	Wind Erosion from Sulfide ore Stockpile	523924.1	3521760.1	1539.0	6.00	74.00	5.60	0.62003	-	-	-	0.09300
PC02	Primary Crusher	524077.9	3521773.9	1540.4	0.00	1.91	1.40	0.24180	-	-	-	0.03662
MD04	Moly Concentrate Bin to Hopper	524033.8	3522982.3	1532.8	3.00	0.47	0.70	0.00011	-	-	-	0.00002
TDS04	Fixed Tailings Conveyor 2 to Fixed Tailings Conveyor 3	524603.0	3522350.1	1511.5	3.00	0.47	0.70	0.05657	-	-	-	0.00857
TDS05	Fixed Tailings Conveyor 3 to Relocatable Conveyor	524801.3	3522465.1	1523.9	3.00	0.47	0.70	0.05657	-	-	-	0.00857
TDS06	Relocatable Conveyor to Shiftable Conveyor	524824.4	3522475.9	1522.2	3.00	0.47	0.70	0.05657	-	-	-	0.00857
TDS07	Shiftable Conveyor to Belt Wagon Conveyor	524903.9	3522511.6	1507.3	3.00	0.47	0.70	0.43164	-	-	-	0.06536
TDS08	Belt Wagon Conveyor to Spreader Crwaler Mounted Conveyor	524973.1	3522545.4	1492.7	3.00	0.47	0.70	0.43164	-	-	-	0.06536
TDS09	Spreader Crawler Mounted Conveyor to Tailings Storage	525053.9	3522581.1	1483.6	3.00	0.47	0.70	0.43164	-	-	-	0.06536
TDS10	Wind Erosion from Tailings Storage	525098.2	3522631.3	1476.5	6.00	573.00	5.60	3.45085	-	-	-	0.51763

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
MS01	Transfer of Bulk Pebble Lime to the Bulk Pebble Lime Silo	523891.5	3522885.84	1546.6	3.00	0.47	0.70	0.18674	-	-	-	0.02828
MS04	Pneumatic Lime Transfer From Truck to Lime Storage Bin (800-BN-801)	524078.69	3522861.62	1523.04	3.00	0.47	0.70	0.51781	-	-	-	0.51781
MS0506	Transfer of Flocculant from Supersacks to Flocculant Storage Bin	524123.4	3522869.4	1523.7	3.00	0.47	0.70	0.00063	-	-	-	0.00009
MS0708	Transfer of Guar from Bags to Guar Feeder (F-Gu) and Transfer of Granular Cobalt Sulfate from Bags to Cobalt	524198.0	3522368.1	1522.6	3.00	0.47	0.70	0.00007	-	-	-	0.00001
HAUL1	Haul Roads	522470.4	3521193.0	1677.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL2	Haul Roads	522484.4	3521156.3	1673.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL3	Haul Roads	522498.6	3521120.5	1685.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL4	Haul Roads	522512.4	3521084.3	1678.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL5	Haul Roads	522525.9	3521047.5	1671.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL6	Haul Roads	522540.4	3521011.3	1668.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL7	Haul Roads	522554.1	3520974.8	1669.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL8	Haul Roads	522567.9	3520938.3	1665.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL9	Haul Roads	522582.1	3520902.5	1656.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL10	Haul Roads	522595.6	3520866.0	1650.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL11	Haul Roads	522610.1	3520829.0	1651.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL12	Haul Roads	522634.4	3520799.3	1670.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL13	Haul Roads	522668.9	3520782.8	1674.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL14	Haul Roads	522706.1	3520770.3	1667.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL15	Haul Roads	522743.1	3520757.3	1657.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL16	Haul Roads	522780.4	3520744.5	1641.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL17	Haul Roads	522811.6	3520720.0	1632.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL18	Haul Roads	522842.9	3520695.8	1628.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL19	Haul Roads	522873.4	3520670.5	1621.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL20	Haul Roads	522905.1	3520649.3	1613.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL21	Haul Roads	522942.4	3520640.5	1606.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL22	Haul Roads	522980.6	3520634.0	1599.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL23	Haul Roads	523019.9	3520627.3	1609.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL24	Haul Roads	523058.1	3520621.3	1616.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL25	Haul Roads	523095.4	3520629.3	1610.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL26	Haul Roads	523131.9	3520643.0	1622.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL27	Haul Roads	523168.4	3520656.8	1616.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL28	Haul Roads	523205.4	3520670.3	1606.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL29	Haul Roads	523241.4	3520684.0	1596.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL30	Haul Roads	523277.9	3520697.8	1598.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL31	Haul Roads	523314.1	3520711.3	1601.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL32	Haul Roads	523350.9	3520724.8	1599.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL33	Haul Roads	523387.4	3520738.5	1591.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL34	Haul Roads	523424.4	3520752.3	1586.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL35	Haul Roads	523457.9	3520772.3	1583.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL36	Haul Roads	523492.1	3520790.8	1575.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL37	Haul Roads	523525.9	3520809.0	1571.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL38	Haul Roads	523560.6	3520827.8	1564.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL39	Haul Roads	523594.9	3520847.0	1570.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL40	Haul Roads	523628.4	3520868.3	1572.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL41	Haul Roads	523662.4	3520888.5	1574.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL42	Haul Roads	523696.6	3520907.8	1577.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL43	Haul Roads	523730.4	3520926.5	1573.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL44	Haul Roads	523765.1	3520945.0	1567.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL45	Haul Roads	523798.6	3520964.3	1563.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL46	Haul Roads	523833.1	3520983.0	1551.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL47	Haul Roads	523866.6	3521002.3	1549.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL48	Haul Roads	523901.1	3521021.3	1550.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL49	Haul Roads	523920.1	3520986.0	1550.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL50	Haul Roads	523931.4	3520947.5	1550.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL51	Haul Roads	523941.9	3520910.8	1561.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL52	Haul Roads	523952.6	3520873.0	1563.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL53	Haul Roads	523963.1	3520834.8	1562.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL54	Haul Roads	523973.4	3520797.5	1562.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL55	Haul Roads	523983.9	3520760.5	1571.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL56	Haul Roads	523995.4	3520722.3	1575.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL57	Haul Roads	524006.4	3520684.0	1570.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL58	Haul Roads	524023.9	3520649.3	1567.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL59	Haul Roads	524042.1	3520613.5	1564.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL60	Haul Roads	524061.1	3520580.3	1553.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL61	Haul Roads	524079.4	3520545.3	1553.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL62	Haul Roads	524098.9	3520511.3	1563.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL63	Haul Roads	524116.6	3520475.3	1565.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL64	Haul Roads	524134.1	3520441.0	1570.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL65	Haul Roads	524149.4	3520404.3	1561.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL66	Haul Roads	524164.9	3520368.5	1552.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL67	Haul Roads	524182.4	3520335.0	1544.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL68	Haul Roads	524199.6	3520300.0	1549.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL69	Haul Roads	523908.1	3521059.5	1549.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL70	Haul Roads	523915.4	3521097.5	1550.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL71	Haul Roads	523926.4	3521135.8	1553.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL72	Haul Roads	523940.4	3521171.5	1545.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL73	Haul Roads	523952.9	3521209.3	1539.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL74	Haul Roads	523965.9	3521245.8	1538.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL75	Haul Roads	523977.9	3521282.5	1536.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL76	Haul Roads	523991.6	3521319.0	1535.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL77	Haul Roads	524004.1	3521355.5	1542.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL78	Haul Roads	524037.1	3521331.8	1538.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL79	Haul Roads	524062.9	3521304.0	1534.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL80	Haul Roads	524087.4	3521275.5	1534.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL81	Haul Roads	524113.9	3521245.5	1543.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL82	Haul Roads	524142.4	3521218.8	1545.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL83	Haul Roads	524010.1	3521393.3	1550.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL84	Haul Roads	524017.4	3521431.8	1547.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL85	Haul Roads	524023.9	3521470.8	1546.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL86	Haul Roads	524030.6	3521509.5	1550.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL87	Haul Roads	524036.9	3521547.0	1544.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL88	Haul Roads	524048.1	3521583.8	1522.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL89	Haul Roads	524060.4	3521621.5	1519.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL90	Haul Roads	524072.1	3521659.5	1521.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL91	Haul Roads	524083.9	3521697.0	1525.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL92	Haul Roads	524095.9	3521733.3	1535.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL93	Haul Roads	524131.6	3521699.0	1524.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL94	Haul Roads	524168.1	3521714.5	1520.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL95	Haul Roads	524202.4	3521732.3	1521.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL96	Haul Roads	524236.4	3521753.3	1516.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL97	Haul Roads	524258.4	3521785.5	1511.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL98	Haul Roads	524279.4	3521819.8	1508.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL99	Haul Roads	524298.9	3521853.3	1511.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL100	Haul Roads	524318.6	3521888.8	1511.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL101	Haul Roads	522485.1	3521197.5	1673.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL102	Haul Roads	522499.4	3521161.8	1668.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL103	Haul Roads	522514.4	3521125.5	1678.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL104	Haul Roads	522528.9	3521090.5	1674.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL105	Haul Roads	522542.6	3521052.5	1664.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL106	Haul Roads	522556.4	3521016.5	1662.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL107	Haul Roads	522570.6	3520979.3	1664.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL108	Haul Roads	522585.1	3520944.3	1661.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL109	Haul Roads	522598.1	3520908.0	1654.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL110	Haul Roads	522613.1	3520872.0	1645.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL111	Haul Roads	522626.4	3520834.3	1648.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL112	Haul Roads	522639.6	3520810.8	1665.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL113	Haul Roads	522676.1	3520797.8	1667.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL114	Haul Roads	522713.4	3520785.5	1661.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL115	Haul Roads	522749.9	3520773.5	1652.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL116	Haul Roads	522786.6	3520760.5	1639.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL117	Haul Roads	522819.9	3520734.8	1625.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL118	Haul Roads	522850.9	3520710.3	1625.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL119	Haul Roads	522881.4	3520686.5	1620.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL120	Haul Roads	522911.9	3520662.3	1613.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL121	Haul Roads	522944.6	3520654.0	1606.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL122	Haul Roads	522982.6	3520647.3	1598.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL123	Haul Roads	523021.1	3520641.0	1600.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL124	Haul Roads	523059.9	3520634.3	1614.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL125	Haul Roads	523088.6	3520643.8	1608.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL126	Haul Roads	523125.9	3520656.8	1618.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL127	Haul Roads	523162.1	3520672.0	1615.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL128	Haul Roads	523197.9	3520684.8	1606.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL129	Haul Roads	523234.9	3520698.5	1596.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL130	Haul Roads	523270.9	3520712.8	1591.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL131	Haul Roads	523308.9	3520725.8	1597.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL132	Haul Roads	523345.4	3520739.0	1599.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL133	Haul Roads	523382.4	3520753.3	1594.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL134	Haul Roads	523418.1	3520766.8	1588.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL135	Haul Roads	523452.4	3520786.5	1582.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL136	Haul Roads	523486.6	3520805.8	1573.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL137	Haul Roads	523520.1	3520824.5	1569.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL138	Haul Roads	523554.6	3520843.0	1567.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL139	Haul Roads	523585.1	3520865.8	1576.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL140	Haul Roads	523617.6	3520889.3	1578.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL141	Haul Roads	523649.1	3520910.8	1577.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL142	Haul Roads	523681.6	3520932.3	1575.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL143	Haul Roads	523714.1	3520954.8	1570.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL144	Haul Roads	523745.6	3520977.5	1565.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL145	Haul Roads	523779.1	3520998.8	1559.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL146	Haul Roads	523811.9	3521018.3	1555.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL147	Haul Roads	523845.4	3521038.8	1549.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL148	Haul Roads	523879.4	3521059.5	1548.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL149	Haul Roads	523942.9	3520992.8	1554.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL150	Haul Roads	523953.6	3520954.8	1559.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL151	Haul Roads	523964.9	3520916.8	1564.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL152	Haul Roads	523974.9	3520878.8	1565.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL153	Haul Roads	523986.1	3520841.5	1567.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL154	Haul Roads	523996.9	3520803.5	1568.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL155	Haul Roads	524007.4	3520767.0	1574.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL156	Haul Roads	524018.4	3520729.0	1573.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL157	Haul Roads	524028.6	3520691.3	1561.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL158	Haul Roads	524046.4	3520657.8	1563.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL159	Haul Roads	524065.1	3520623.8	1559.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL160	Haul Roads	524083.6	3520587.8	1552.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL161	Haul Roads	524102.4	3520554.3	1550.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL162	Haul Roads	524119.9	3520519.0	1560.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL163	Haul Roads	524137.4	3520484.8	1562.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL164	Haul Roads	524155.6	3520449.8	1565.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL165	Haul Roads	524173.9	3520415.0	1563.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL166	Haul Roads	524189.6	3520379.3	1555.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL167	Haul Roads	524207.4	3520345.3	1543.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL168	Haul Roads	524224.9	3520309.8	1543.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL169	Haul Roads	523893.1	3521097.5	1547.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL170	Haul Roads	523907.9	3521134.0	1549.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL171	Haul Roads	523921.1	3521171.3	1543.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL172	Haul Roads	523933.1	3521207.3	1537.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL173	Haul Roads	523947.1	3521243.5	1538.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL174	Haul Roads	523959.9	3521280.8	1536.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL175	Haul Roads	523973.1	3521317.3	1536.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL176	Haul Roads	523986.9	3521353.5	1541.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL177	Haul Roads	524027.9	3521374.8	1547.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL178	Haul Roads	524052.1	3521343.8	1538.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL179	Haul Roads	524076.6	3521313.3	1534.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL180	Haul Roads	524101.1	3521284.5	1534.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL181	Haul Roads	524127.1	3521254.8	1538.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL182	Haul Roads	524152.4	3521228.5	1542.5	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL183	Haul Roads	523992.4	3521394.0	1551.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL184	Haul Roads	523998.6	3521433.5	1550.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL185	Haul Roads	524006.1	3521471.3	1547.6	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL186	Haul Roads	524012.9	3521509.5	1551.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL187	Haul Roads	524020.4	3521547.8	1540.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL188	Haul Roads	524027.6	3521587.0	1520.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL189	Haul Roads	524036.4	3521625.5	1523.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL190	Haul Roads	524045.9	3521663.8	1522.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL191	Haul Roads	524056.1	3521701.0	1528.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL192	Haul Roads	524066.1	3521740.3	1536.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL193	Haul Roads	524127.6	3521706.3	1525.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL194	Haul Roads	524161.6	3521724.5	1523.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL195	Haul Roads	524196.9	3521741.8	1523.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL196	Haul Roads	524229.1	3521763.3	1519.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL197	Haul Roads	524247.4	3521790.8	1513.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL198	Haul Roads	524266.9	3521825.5	1509.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL199	Haul Roads	524287.4	3521857.8	1508.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL200	Haul Roads	524307.1	3521892.3	1508.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL201	Haul Roads	524014.6	3520885.0	1565.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL202	Haul Roads	524052.6	3520892.0	1560.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL203	Haul Roads	524091.6	3520898.5	1557.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL204	Haul Roads	524129.4	3520905.8	1554.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL205	Haul Roads	524168.1	3520911.8	1550.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL206	Haul Roads	524207.1	3520916.8	1542.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL207	Haul Roads	524216.9	3520704.8	1560.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL208	Haul Roads	524179.6	3520694.5	1564.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL209	Haul Roads	524141.6	3520683.3	1559.1	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL210	Haul Roads	524105.4	3520671.0	1552.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL211	Haul Roads	523923.1	3520819.0	1558.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL212	Haul Roads	523886.6	3520805.3	1559.4	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL213	Haul Roads	523850.1	3520792.0	1562.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL214	Haul Roads	523814.4	3520778.3	1565.0	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL215	Haul Roads	523777.4	3520764.8	1564.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL216	Haul Roads	523972.1	3520660.8	1577.2	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL217	Haul Roads	523941.9	3520637.8	1574.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL218	Haul Roads	523910.9	3520614.8	1566.3	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL219	Haul Roads	523878.6	3520590.8	1565.8	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL220	Haul Roads	523846.9	3520568.0	1571.7	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
HAUL221	Haul Roads	523814.4	3520544.3	1573.9	6.50	16.28	6.05	0.47696	-	0.63608	0.00079	0.06502
UNWD1	Unload to Waste Dump #1	524113.6	3520254.4	1569.7	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD2	Unload to Waste Dump #2	524188.9	3520117.6	1553.1	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD3	Unload to Waste Dump #3	524240.9	3519971.6	1539.4	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD4	Unload to Waste Dump #4	523967.4	3520212.1	1586.5	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD5	Unload to Waste Dump #5	524028.6	3520056.4	1552.1	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD6	Unload to Waste Dump #6	524094.6	3519896.1	1576.4	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD7	Unload to Waste Dump #7	523882.4	3519999.9	1586.9	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD8	Unload to Waste Dump #8	523948.4	3519844.1	1548.7	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD9	Unload to Waste Dump #9	523788.1	3519792.4	1589.2	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
UNWD10	Unload to Waste Dump #10	523637.1	3519872.4	1582.1	6.50	4.00	6.05	0.48762	-	0.63608	0.00079	0.09017
PAV1	Paved Facility Roads	524089.4	3522132.2	1517.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV2	Paved Facility Roads	524061.6	3522148.0	1525.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV3	Paved Facility Roads	524038.6	3522169.1	1525.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV4	Paved Facility Roads	524022.0	3522196.2	1524.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV5	Paved Facility Roads	524011.0	3522226.3	1524.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV6	Paved Facility Roads	524000.1	3522256.4	1525.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV7	Paved Facility Roads	523991.2	3522287.0	1531.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV8	Paved Facility Roads	523986.0	3522318.5	1536.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV9	Paved Facility Roads	523980.7	3522350.1	1541.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV10	Paved Facility Roads	523975.4	3522381.7	1539.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV11	Paved Facility Roads	523970.2	3522413.2	1540.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV12	Paved Facility Roads	523964.9	3522444.8	1547.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV13	Paved Facility Roads	523959.6	3522476.4	1546.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV14	Paved Facility Roads	523954.3	3522507.9	1549.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV15	Paved Facility Roads	523952.1	3522539.7	1551.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV16	Paved Facility Roads	523953.8	3522571.6	1552.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV17	Paved Facility Roads	523955.4	3522603.6	1548.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV18	Paved Facility Roads	523957.0	3522635.5	1540.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV19	Paved Facility Roads	523958.7	3522667.5	1546.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV20	Paved Facility Roads	523960.3	3522699.4	1550.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV21	Paved Facility Roads	523962.0	3522731.4	1553.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV22	Paved Facility Roads	523968.0	3522762.8	1543.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV23	Paved Facility Roads	523974.1	3522794.2	1534.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV24	Paved Facility Roads	523974.9	3522826.2	1531.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV25	Paved Facility Roads	523974.9	3522858.2	1537.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV26	Paved Facility Roads	523969.9	3522889.8	1536.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV27	Paved Facility Roads	523964.8	3522921.4	1537.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV28	Paved Facility Roads	523959.7	3522953.0	1535.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV29	Paved Facility Roads	523948.2	3522982.7	1545.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV30	Paved Facility Roads	523948.5	3523013.3	1551.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV31	Paved Facility Roads	523961.7	3523040.3	1546.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV32	Paved Facility Roads	523989.2	3523056.5	1536.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV33	Paved Facility Roads	524021.2	3523056.5	1532.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV34	Paved Facility Roads	524047.1	3523039.7	1524.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV35	Paved Facility Roads	524071.7	3523019.3	1525.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV36	Paved Facility Roads	524097.4	3523000.1	1522.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV37	Paved Facility Roads	524125.1	3522984.9	1521.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV38	Paved Facility Roads	524155.6	3522975.3	1516.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV39	Paved Facility Roads	524187.2	3522971.5	1514.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV40	Paved Facility Roads	524218.9	3522973.3	1512.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV41	Paved Facility Roads	524250.5	3522978.4	1508.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV42	Paved Facility Roads	524282.3	3522982.1	1505.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV43	Paved Facility Roads	524314.2	3522984.3	1503.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV44	Paved Facility Roads	524346.1	3522986.2	1504.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV45	Paved Facility Roads	524378.1	3522986.2	1506.6	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV46	Paved Facility Roads	524410.1	3522986.3	1508.0	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV47	Paved Facility Roads	524440.9	3522993.0	1517.5	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV48	Paved Facility Roads	524468.8	3523008.7	1526.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV49	Paved Facility Roads	524496.7	3523024.4	1514.6	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV50	Paved Facility Roads	524514.7	3523050.6	1498.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV51	Paved Facility Roads	524532.0	3523077.5	1510.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV52	Paved Facility Roads	524538.9	3523108.8	1520.4	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV53	Paved Facility Roads	524545.8	3523140.0	1527.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV54	Paved Facility Roads	524552.7	3523171.2	1527.0	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV55	Paved Facility Roads	524559.6	3523202.5	1512.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV56	Paved Facility Roads	524564.9	3523234.0	1513.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV57	Paved Facility Roads	524569.8	3523265.7	1522.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV58	Paved Facility Roads	524574.8	3523297.3	1526.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV59	Paved Facility Roads	524579.8	3523328.9	1513.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV60	Paved Facility Roads	524584.8	3523360.5	1507.2	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV61	Paved Facility Roads	524589.7	3523392.1	1502.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV62	Paved Facility Roads	524594.7	3523423.7	1517.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV63	Paved Facility Roads	524608.6	3523450.8	1514.8	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV64	Paved Facility Roads	524631.1	3523473.6	1511.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV65	Paved Facility Roads	524653.5	3523496.4	1507.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV66	Paved Facility Roads	524676.0	3523519.2	1498.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV67	Paved Facility Roads	524698.5	3523542.0	1489.2	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV68	Paved Facility Roads	524720.9	3523564.8	1490.9	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV69	Paved Facility Roads	524743.4	3523587.5	1503.9	5.00	7.44	4.65	0.00379	-	0.04668	0.00135	0.00185
PAV70	Paved Facility Roads	523985.4	3522376.7	1538.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV71	Paved Facility Roads	524016.8	3522370.7	1536.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV72	Paved Facility Roads	524047.2	3522360.7	1533.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV73	Paved Facility Roads	524077.6	3522350.7	1528.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV74	Paved Facility Roads	524108.0	3522340.7	1524.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV75	Paved Facility Roads	524138.4	3522330.7	1523.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV76	Paved Facility Roads	524147.9	3522351.2	1523.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV77	Paved Facility Roads	524149.6	3522383.2	1525.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV78	Paved Facility Roads	524151.4	3522415.1	1530.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV79	Paved Facility Roads	524181.3	3522409.5	1524.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV80	Paved Facility Roads	524211.3	3522398.4	1526.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190

Table I.5 Year 1- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV81	Paved Facility Roads	524275.7	3522970.0	1505.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV82	Paved Facility Roads	524286.5	3522939.8	1504.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV83	Paved Facility Roads	524297.3	3522909.7	1508.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV84	Paved Facility Roads	524308.1	3522879.6	1511.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV85	Paved Facility Roads	524318.9	3522849.5	1513.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV86	Paved Facility Roads	524329.7	3522819.4	1512.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV87	Paved Facility Roads	524343.1	3522790.4	1509.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV88	Paved Facility Roads	524358.0	3522762.0	1513.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV89	Paved Facility Roads	524370.4	3522732.8	1516.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV90	Paved Facility Roads	524371.4	3522701.2	1512.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV91	Paved Facility Roads	524364.8	3522670.2	1521.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV92	Paved Facility Roads	524349.5	3522642.4	1532.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV93	Paved Facility Roads	524333.9	3522614.6	1537.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV94	Paved Facility Roads	524324.6	3522584.0	1526.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV95	Paved Facility Roads	524315.2	3522553.4	1520.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV96	Paved Facility Roads	524310.4	3522538.0	1519.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV97	Paved Facility Roads	524059.7	3522944.2	1528.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV98	Paved Facility Roads	524039.3	3522919.5	1525.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV99	Paved Facility Roads	524052.8	3522904.5	1523.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV100	Paved Facility Roads	524084.3	3522909.3	1523.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV101	Paved Facility Roads	524116.3	3522907.9	1517.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV102	Paved Facility Roads	524148.3	3522906.5	1512.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV103	Paved Facility Roads	524180.1	3522908.4	1511.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV104	Paved Facility Roads	524210.5	3522917.1	1511.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV105	Paved Facility Roads	524229.7	3522941.3	1511.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
PAV106	Paved Facility Roads	524232.7	3522964.0	1511.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00135	0.01190
Total								**292.7235**	-	**1042.244**	**104.3336**	**27.92971**

Table I.6 Year 1 - Modeling Annual Emissions - Open Pit Source														
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Easterly Length (m)**	**Northerly Length (m)**	**Pit Volume (m^3)**	**Angle from North**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PIT	Open Pit Mine	522319.88	3521271.1	1695.7	0.00	700.00	1000.00	173532000	0	52.72127	-	73.87588	0.10649	8.86227

Table I.7 Year 5- Modeling Hourly Emissions - Point Sources													
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Stack Height (ft)**	**Temperature (°F)**	**Exit Velocity (fps)**	**Stack Diameter (ft)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PCL01	Crushing Area Scrubber (100-DC-001)	524076.4	3521780.6	1540.4	22.68	100.00	0.001	2.90	0.6400	-	-	-	0.1182
PCL02	Stockpile Area Scrubber (150-DC-001)	523855.4	3522544.9	1559.1	22.05	100.00	21.529	3.72	1.4700	-	-	-	0.2226
PCL03	Reclaim Tunnel Scrubber (200-DC-001)	523862.1	3522669.4	1550.8	18.67	100.00	0.001	1.81	0.3600	-	-	-	0.0545
PCL04	Pebble Crusher Area Scrubber	523898.7	3522876.4	1544.7	18.61	100.00	0.001	1.77	0.3200	-	-	-	0.0591
PCL05	Copper Concentrate Scrubber 1	524033.0	3522992.6	1533.8	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL06	Copper Concentrate Scrubber 2	524043.8	3522990.6	1530.1	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL07	Moly Scrubber/Electrostatic Precipitator	524114.0	3522935.8	1524.6	55.00	500.00	10.620	1.00	0.0140	-	-	-	0.0132
PCL08	Moly Dust Collector (510-DC-001)	524034.0	3522999.3	1534.2	6.27	100.00	0.001	0.90	0.0530	-	-	-	0.0080
PCL09	Dust Collector, model DFO-4-16, Donaldson	523991.4	3522567.9	1549.3	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL10	Dust Collector, model DFO-4-16, Donaldson	524009.6	3522566.4	1547.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL11	Dust Collector, model DFO-4-16, Donaldson	524029.4	3522565.1	1543.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL12	SAG Feed Conveyor Dust Collector (200-DC-001)	523900.7	3522872.5	1543.5	18.71	100.00	0.001	1.90	0.4600	-	-	-	0.0697
FB01	Diesel Electrowinning Hot water Generator	524241.0	3522386.3	1524.9	12.00	1000.00	130.200	0.30	0.1007	0.2190	0.8759	0.0093	0.0674
Total									**8.0436**	**0.2190**	**0.8759**	**0.0093**	**1.6757**

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
BLST1	Blasting	522517.6	3521978.6	1526.5	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST2	Blasting	522753.4	3521978.6	1526.5	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST3	Blasting	522510.1	3521788.4	1526.5	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST5	Blasting	522510.1	3521575.4	1526.5	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST4	Blasting	522751.3	3521784.1	1526.5	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
BLST6	Blasting	522751.3	3521576.3	1526.5	10.00	14.19	9.30	28.44887	580.66667	147.33333	17.33333	1.64128
UNSUL1	Unload to Sulfide Stockpile #1	523945.9	3521709.9	1531.4	6.50	4.00	6.05	0.54627	0.42505	0.63886	0.00079	0.09914
UNSUL2	Unload to Sulfide Stockpile #2	523878.1	3521730.1	1533.1	6.50	4.00	6.05	0.54627	0.42505	0.63886	0.00079	0.09914
UNSUL3	Unload to Sulfide Stockpile #3	523906.1	3521805.9	1545.0	6.50	4.00	6.05	0.54627	0.42505	0.63886	0.00079	0.09914
UNSUL4	Unload to Sulfide Stockpile #4	523963.4	3521788.6	1549.9	6.50	4.00	6.05	0.54627	0.42505	0.63886	0.00079	0.09914
PC01	Wind Erosion from Sulfide ore Stockpile	523924.1	3521760.1	1539.0	6.00	74.00	5.60	0.62003	-	-	-	0.09300
PC02	Primary Crusher	524077.9	3521773.9	1540.4	0.00	1.91	1.40	0.68359	-	-	-	0.10352
MD04	Moly Concentrate Bin to Hopper	524033.8	3522982.3	1532.8	3.00	0.47	0.70	0.00030	-	-	-	0.00004
TDS04	Fixed Tailings Conveyor 2 to Fixed Tailings Conveyor 3	524603.0	3522350.1	1511.5	3.00	0.47	0.70	0.12413	-	-	-	0.01880
TDS05	Fixed Tailings Conveyor 3 to Relocatable Conveyor	524801.3	3522465.1	1523.9	3.00	0.47	0.70	0.12413	-	-	-	0.01880
TDS06	Relocatable Conveyor to Shiftable Conveyor	524824.4	3522475.9	1522.2	3.00	0.47	0.70	0.12413	-	-	-	0.01880
TDS07	Shiftable Conveyor to Belt Wagon Conveyor	524903.9	3522511.6	1507.3	3.00	0.47	0.70	0.94712	-	-	-	0.14342
TDS08	Belt Wagon Conveyor to Spreader Crwaler Mounted Conveyor	524973.1	3522545.4	1492.7	3.00	0.47	0.70	0.94712	-	-	-	0.14342
TDS09	Spreader Crawler Mounted Conveyor to Tailings Storage	525053.9	3522581.1	1483.6	3.00	0.47	0.70	0.94712	-	-	-	0.14342
TDS10	Wind Erosion from Tailings Storage	525098.2	3522631.3	1476.5	6.00	573.00	5.60	3.45085	-	-	-	0.51763
MS01	Transfer of Bulk Pebble Lime to the Bulk Pebble Lime Silo	523891.5	3522885.84	1546.6	3.00	0.47	0.70	0.22409	-	-	-	0.03393
MS04	Pneumatic Lime Transfer From Truck to Lime Storage Bin (800-BN-801)	524078.69	3522861.62	1523.04	3.00	0.47	0.70	0.62137	-	-	-	0.62137
MS0506	Transfer of Flocculant from Supersacks to Flocculant Storage Bin	524123.4	3522869.4	1523.7	3.00	0.47	0.70	0.00075	-	-	-	0.00011

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
MS0708	Transfer of Guar from Bags to Guar Feeder (F-Gu) and Transfer of Granular Cobalt Sulfate from Bags to Cobalt	524198.0	3522368.1	1522.6	3.00	0.47	0.70	0.00008	-	-	-	0.00001
HAUL1	Haul Roads	522470.4	3521193.0	1677.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL2	Haul Roads	522484.4	3521156.3	1673.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL3	Haul Roads	522498.6	3521120.5	1685.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL4	Haul Roads	522512.4	3521084.3	1678.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL5	Haul Roads	522525.9	3521047.5	1671.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL6	Haul Roads	522540.4	3521011.3	1668.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL7	Haul Roads	522554.1	3520974.8	1669.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL8	Haul Roads	522567.9	3520938.3	1665.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL9	Haul Roads	522582.1	3520902.5	1656.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL10	Haul Roads	522595.6	3520866.0	1650.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL11	Haul Roads	522610.1	3520829.0	1651.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL12	Haul Roads	522634.4	3520799.3	1670.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL13	Haul Roads	522668.9	3520782.8	1674.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL14	Haul Roads	522706.1	3520770.3	1667.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL15	Haul Roads	522743.1	3520757.3	1657.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL16	Haul Roads	522780.4	3520744.5	1641.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL17	Haul Roads	522811.6	3520720.0	1632.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL18	Haul Roads	522842.9	3520695.8	1628.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL19	Haul Roads	522873.4	3520670.5	1621.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL20	Haul Roads	522905.1	3520649.3	1613.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL21	Haul Roads	522942.4	3520640.5	1606.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL22	Haul Roads	522980.6	3520634.0	1599.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL23	Haul Roads	523019.9	3520627.3	1609.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL24	Haul Roads	523058.1	3520621.3	1616.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL25	Haul Roads	523095.4	3520629.3	1610.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL26	Haul Roads	523131.9	3520643.0	1622.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL27	Haul Roads	523168.4	3520656.8	1616.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL28	Haul Roads	523205.4	3520670.3	1606.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL29	Haul Roads	523241.4	3520684.0	1596.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL30	Haul Roads	523277.9	3520697.8	1598.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL31	Haul Roads	523314.1	3520711.3	1601.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL32	Haul Roads	523350.9	3520724.8	1599.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL33	Haul Roads	523387.4	3520738.5	1591.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL34	Haul Roads	523424.4	3520752.3	1586.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL35	Haul Roads	523457.9	3520772.3	1583.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL36	Haul Roads	523492.1	3520790.8	1575.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL37	Haul Roads	523525.9	3520809.0	1571.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL38	Haul Roads	523560.6	3520827.8	1564.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL39	Haul Roads	523594.9	3520847.0	1570.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL40	Haul Roads	523628.4	3520868.3	1572.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL41	Haul Roads	523662.4	3520888.5	1574.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL42	Haul Roads	523696.6	3520907.8	1577.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL43	Haul Roads	523730.4	3520926.5	1573.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL44	Haul Roads	523765.1	3520945.0	1567.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL45	Haul Roads	523798.6	3520964.3	1563.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL46	Haul Roads	523833.1	3520983.0	1551.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL47	Haul Roads	523866.6	3521002.3	1549.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL48	Haul Roads	523901.1	3521021.3	1550.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL49	Haul Roads	523920.1	3520986.0	1550.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL50	Haul Roads	523931.4	3520947.5	1550.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL51	Haul Roads	523941.9	3520910.8	1561.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL52	Haul Roads	523952.6	3520873.0	1563.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL53	Haul Roads	523963.1	3520834.8	1562.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL54	Haul Roads	523973.4	3520797.5	1562.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL55	Haul Roads	523983.9	3520760.5	1571.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL56	Haul Roads	523995.4	3520722.3	1575.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL57	Haul Roads	524006.4	3520684.0	1570.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL58	Haul Roads	524023.9	3520649.3	1567.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL59	Haul Roads	524042.1	3520613.5	1564.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL60	Haul Roads	524061.1	3520580.3	1553.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL61	Haul Roads	524079.4	3520545.3	1553.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL62	Haul Roads	524098.9	3520511.3	1563.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL63	Haul Roads	524116.6	3520475.3	1565.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL64	Haul Roads	524134.1	3520441.0	1570.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL65	Haul Roads	524149.4	3520404.3	1561.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL66	Haul Roads	524164.9	3520368.5	1552.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL67	Haul Roads	524182.4	3520335.0	1544.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL68	Haul Roads	524199.6	3520300.0	1549.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL69	Haul Roads	523908.1	3521059.5	1549.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL70	Haul Roads	523915.4	3521097.5	1550.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL71	Haul Roads	523926.4	3521135.8	1553.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL72	Haul Roads	523940.4	3521171.5	1545.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL73	Haul Roads	523952.9	3521209.3	1539.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL74	Haul Roads	523965.9	3521245.8	1538.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL75	Haul Roads	523977.9	3521282.5	1536.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL76	Haul Roads	523991.6	3521319.0	1535.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL77	Haul Roads	524004.1	3521355.5	1542.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL78	Haul Roads	524037.1	3521331.8	1538.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL79	Haul Roads	524062.9	3521304.0	1534.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL80	Haul Roads	524087.4	3521275.5	1534.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL81	Haul Roads	524113.9	3521245.5	1543.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL82	Haul Roads	524142.4	3521218.8	1545.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL83	Haul Roads	524010.1	3521393.3	1550.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL84	Haul Roads	524017.4	3521431.8	1547.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL85	Haul Roads	524023.9	3521470.8	1546.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL86	Haul Roads	524030.6	3521509.5	1550.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL87	Haul Roads	524036.9	3521547.0	1544.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL88	Haul Roads	524048.1	3521583.8	1522.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL89	Haul Roads	524060.4	3521621.5	1519.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL90	Haul Roads	524072.1	3521659.5	1521.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL91	Haul Roads	524083.9	3521697.0	1525.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL92	Haul Roads	524095.9	3521733.3	1535.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL93	Haul Roads	524131.6	3521699.0	1524.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL94	Haul Roads	524168.1	3521714.5	1520.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL95	Haul Roads	524202.4	3521732.3	1521.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL96	Haul Roads	524236.4	3521753.3	1516.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL97	Haul Roads	524258.4	3521785.5	1511.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL98	Haul Roads	524279.4	3521819.8	1508.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL99	Haul Roads	524298.9	3521853.3	1511.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL100	Haul Roads	524318.6	3521888.8	1511.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL101	Haul Roads	522485.1	3521197.5	1673.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL102	Haul Roads	522499.4	3521161.8	1668.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL103	Haul Roads	522514.4	3521125.5	1678.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL104	Haul Roads	522528.9	3521090.5	1674.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL105	Haul Roads	522542.6	3521052.5	1664.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL106	Haul Roads	522556.4	3521016.5	1662.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL107	Haul Roads	522570.6	3520979.3	1664.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL108	Haul Roads	522585.1	3520944.3	1661.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL109	Haul Roads	522598.1	3520908.0	1654.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL110	Haul Roads	522613.1	3520872.0	1645.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL111	Haul Roads	522626.4	3520834.3	1648.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL112	Haul Roads	522639.6	3520810.8	1665.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL113	Haul Roads	522676.1	3520797.8	1667.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL114	Haul Roads	522713.4	3520785.5	1661.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL115	Haul Roads	522749.9	3520773.5	1652.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL116	Haul Roads	522786.6	3520760.5	1639.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL117	Haul Roads	522819.9	3520734.8	1625.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL118	Haul Roads	522850.9	3520710.3	1625.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL119	Haul Roads	522881.4	3520686.5	1620.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL120	Haul Roads	522911.9	3520662.3	1613.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL121	Haul Roads	522944.6	3520654.0	1606.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL122	Haul Roads	522982.6	3520647.3	1598.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL123	Haul Roads	523021.1	3520641.0	1600.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL124	Haul Roads	523059.9	3520634.3	1614.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL125	Haul Roads	523088.6	3520643.8	1608.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL126	Haul Roads	523125.9	3520656.8	1618.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL127	Haul Roads	523162.1	3520672.0	1615.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL128	Haul Roads	523197.9	3520684.8	1606.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL129	Haul Roads	523234.9	3520698.5	1596.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL130	Haul Roads	523270.9	3520712.8	1591.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL131	Haul Roads	523308.9	3520725.8	1597.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL132	Haul Roads	523345.4	3520739.0	1599.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL133	Haul Roads	523382.4	3520753.3	1594.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL134	Haul Roads	523418.1	3520766.8	1588.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL135	Haul Roads	523452.4	3520786.5	1582.6	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL136	Haul Roads	523486.6	3520805.8	1573.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL137	Haul Roads	523520.1	3520824.5	1569.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL138	Haul Roads	523554.6	3520843.0	1567.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL139	Haul Roads	523585.1	3520865.8	1576.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL140	Haul Roads	523617.6	3520889.3	1578.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL141	Haul Roads	523649.1	3520910.8	1577.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL142	Haul Roads	523681.6	3520932.3	1575.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL143	Haul Roads	523714.1	3520954.8	1570.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL144	Haul Roads	523745.6	3520977.5	1565.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL145	Haul Roads	523779.1	3520998.8	1559.5	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL146	Haul Roads	523811.9	3521018.3	1555.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL147	Haul Roads	523845.4	3521038.8	1549.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL148	Haul Roads	523879.4	3521059.5	1548.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL149	Haul Roads	523942.9	3520992.8	1554.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL150	Haul Roads	523953.6	3520954.8	1559.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL151	Haul Roads	523964.9	3520916.8	1564.3	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL152	Haul Roads	523974.9	3520878.8	1565.9	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL153	Haul Roads	523986.1	3520841.5	1567.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL154	Haul Roads	523996.9	3520803.5	1568.4	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL155	Haul Roads	524007.4	3520767.0	1574.2	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL156	Haul Roads	524018.4	3520729.0	1573.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL157	Haul Roads	524028.6	3520691.3	1561.1	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL158	Haul Roads	524046.4	3520657.8	1563.0	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL159	Haul Roads	524065.1	3520623.8	1559.7	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
HAUL160	Haul Roads	524083.6	3520587.8	1552.8	6.50	16.28	6.05	0.62476	0.42505	0.63886	0.00079	0.07989
PAV1	Paved Facility Roads	524089.4	3522132.2	1517.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV2	Paved Facility Roads	524061.6	3522148.0	1525.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV3	Paved Facility Roads	524038.6	3522169.1	1525.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV4	Paved Facility Roads	524022.0	3522196.2	1524.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV5	Paved Facility Roads	524011.0	3522226.3	1524.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV6	Paved Facility Roads	524000.1	3522256.4	1525.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV7	Paved Facility Roads	523991.2	3522287.0	1531.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV8	Paved Facility Roads	523986.0	3522318.5	1536.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV9	Paved Facility Roads	523980.7	3522350.1	1541.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV10	Paved Facility Roads	523975.4	3522381.7	1539.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV11	Paved Facility Roads	523970.2	3522413.2	1540.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV12	Paved Facility Roads	523964.9	3522444.8	1547.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV13	Paved Facility Roads	523959.6	3522476.4	1546.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV14	Paved Facility Roads	523954.3	3522507.9	1549.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV15	Paved Facility Roads	523952.1	3522539.7	1551.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV16	Paved Facility Roads	523953.8	3522571.6	1552.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV17	Paved Facility Roads	523955.4	3522603.6	1548.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV18	Paved Facility Roads	523957.0	3522635.5	1540.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV19	Paved Facility Roads	523958.7	3522667.5	1546.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV20	Paved Facility Roads	523960.3	3522699.4	1550.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV21	Paved Facility Roads	523962.0	3522731.4	1553.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV22	Paved Facility Roads	523968.0	3522762.8	1543.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV23	Paved Facility Roads	523974.1	3522794.2	1534.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV24	Paved Facility Roads	523974.9	3522826.2	1531.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV25	Paved Facility Roads	523974.9	3522858.2	1537.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV26	Paved Facility Roads	523969.9	3522889.8	1536.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV27	Paved Facility Roads	523964.8	3522921.4	1537.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV28	Paved Facility Roads	523959.7	3522953.0	1535.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV29	Paved Facility Roads	523948.2	3522982.7	1545.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV30	Paved Facility Roads	523948.5	3523013.3	1551.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV31	Paved Facility Roads	523961.7	3523040.3	1546.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV32	Paved Facility Roads	523989.2	3523056.5	1536.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV33	Paved Facility Roads	524021.2	3523056.5	1532.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV34	Paved Facility Roads	524047.1	3523039.7	1524.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV35	Paved Facility Roads	524071.7	3523019.3	1525.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV36	Paved Facility Roads	524097.4	3523000.1	1522.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV37	Paved Facility Roads	524125.1	3522984.9	1521.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV38	Paved Facility Roads	524155.6	3522975.3	1516.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV39	Paved Facility Roads	524187.2	3522971.5	1514.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV40	Paved Facility Roads	524218.9	3522973.3	1512.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV41	Paved Facility Roads	524250.5	3522978.4	1508.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV42	Paved Facility Roads	524282.3	3522982.1	1505.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV43	Paved Facility Roads	524314.2	3522984.3	1503.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV44	Paved Facility Roads	524346.1	3522986.2	1504.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV45	Paved Facility Roads	524378.1	3522986.2	1506.6	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV46	Paved Facility Roads	524410.1	3522986.3	1508.0	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV47	Paved Facility Roads	524440.9	3522993.0	1517.5	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV48	Paved Facility Roads	524468.8	3523008.7	1526.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV49	Paved Facility Roads	524496.7	3523024.4	1514.6	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV50	Paved Facility Roads	524514.7	3523050.6	1498.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV51	Paved Facility Roads	524532.0	3523077.5	1510.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV52	Paved Facility Roads	524538.9	3523108.8	1520.4	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV53	Paved Facility Roads	524545.8	3523140.0	1527.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV54	Paved Facility Roads	524552.7	3523171.2	1527.0	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV55	Paved Facility Roads	524559.6	3523202.5	1512.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV56	Paved Facility Roads	524564.9	3523234.0	1513.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV57	Paved Facility Roads	524569.8	3523265.7	1522.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV58	Paved Facility Roads	524574.8	3523297.3	1526.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV59	Paved Facility Roads	524579.8	3523328.9	1513.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV60	Paved Facility Roads	524584.8	3523360.5	1507.2	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV61	Paved Facility Roads	524589.7	3523392.1	1502.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV62	Paved Facility Roads	524594.7	3523423.7	1517.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV63	Paved Facility Roads	524608.6	3523450.8	1514.8	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV64	Paved Facility Roads	524631.1	3523473.6	1511.3	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV65	Paved Facility Roads	524653.5	3523496.4	1507.1	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV66	Paved Facility Roads	524676.0	3523519.2	1498.7	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV67	Paved Facility Roads	524698.5	3523542.0	1489.2	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV68	Paved Facility Roads	524720.9	3523564.8	1490.9	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV69	Paved Facility Roads	524743.4	3523587.5	1503.9	5.00	7.44	4.65	0.01148	0.23606	0.06672	0.00592	0.00418
PAV70	Paved Facility Roads	523985.4	3522376.7	1538.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV71	Paved Facility Roads	524016.8	3522370.7	1536.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV72	Paved Facility Roads	524047.2	3522360.7	1533.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV73	Paved Facility Roads	524077.6	3522350.7	1528.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV74	Paved Facility Roads	524108.0	3522340.7	1524.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV75	Paved Facility Roads	524138.4	3522330.7	1523.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV76	Paved Facility Roads	524147.9	3522351.2	1523.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV77	Paved Facility Roads	524149.6	3522383.2	1525.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV78	Paved Facility Roads	524151.4	3522415.1	1530.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV79	Paved Facility Roads	524181.3	3522409.5	1524.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV80	Paved Facility Roads	524211.3	3522398.4	1526.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV81	Paved Facility Roads	524275.7	3522970.0	1505.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV82	Paved Facility Roads	524286.5	3522939.8	1504.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV83	Paved Facility Roads	524297.3	3522909.7	1508.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV84	Paved Facility Roads	524308.1	3522879.6	1511.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV85	Paved Facility Roads	524318.9	3522849.5	1513.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV86	Paved Facility Roads	524329.7	3522819.4	1512.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV87	Paved Facility Roads	524343.1	3522790.4	1509.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV88	Paved Facility Roads	524358.0	3522762.0	1513.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV89	Paved Facility Roads	524370.4	3522732.8	1516.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV90	Paved Facility Roads	524371.4	3522701.2	1512.4	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV91	Paved Facility Roads	524364.8	3522670.2	1521.9	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV92	Paved Facility Roads	524349.5	3522642.4	1532.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV93	Paved Facility Roads	524333.9	3522614.6	1537.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159

Table I.8 Year 5- Modeling Hourly Emissions - Volume Sources

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)	PM_{10} (lb/hr)	CO (lb/hr)	NO_x (lb/hr)	SO_2 (lb/hr)	$PM_{2.5}$ (lb/hr)
PAV94	Paved Facility Roads	524324.6	3522584.0	1526.1	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV95	Paved Facility Roads	524315.2	3522553.4	1520.3	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV96	Paved Facility Roads	524310.4	3522538.0	1519.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV97	Paved Facility Roads	524059.7	3522944.2	1528.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV98	Paved Facility Roads	524039.3	3522919.5	1525.0	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV99	Paved Facility Roads	524052.8	3522904.5	1523.2	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV100	Paved Facility Roads	524084.3	3522909.3	1523.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV101	Paved Facility Roads	524116.3	3522907.9	1517.7	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV102	Paved Facility Roads	524148.3	3522906.5	1512.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV103	Paved Facility Roads	524180.1	3522908.4	1511.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV104	Paved Facility Roads	524210.5	3522917.1	1511.6	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV105	Paved Facility Roads	524229.7	3522941.3	1511.8	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
PAV106	Paved Facility Roads	524232.7	3522964.0	1511.5	5.00	7.44	4.65	0.12317	0.23606	0.06672	0.00592	0.03159
Total								**291.5830**	**3578.7308**	**995.8448**	**104.7576**	**27.4648**

Table I.9 Year 5 - Modeling Hourly Emissions - Open Pit Source

Source ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Easterly Length (m)	Northerly Length (m)	Pit Volume (m^3)	Angle from North	PM_{10} (lb/hr)	CO (lb/hr)	NO_x (lb/hr)	SO_2 (lb/hr)	$PM_{2.5}$ (lb/hr)
PIT	Open Pit Mine	522269.9	3521221.1	1742.4	0	750.00	1050.00	340041000	0	118.07813	104.40467	133.01498	0.18027	17.06994
PIT2	2nd Pit-Berm	523161.4	3520551.6	1645.9	0	1200.00	1400.00	76809601.3	60	44.74295	32.72914	49.19192	0.06119	6.14057
Total										**162.8211**	**137.1338**	**182.2069**	**0.2415**	**162.8211**

Table I.10 Year 5- Modeling Annual Emissions - Point Sources													
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Stack Height (ft)**	**Temperature (°F)**	**Exit Velocity (fps)**	**Stack Diameter (ft)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PCL01	Crushing Area Scrubber (100-DC-001)	524076.4	3521780.6	1540.4	22.68	100.00	0.001	2.90	0.6400	-	-	-	0.1182
PCL02	Stockpile Area Scrubber (150-DC-001)	523855.4	3522544.9	1559.1	22.05	100.00	21.529	3.72	1.4700	-	-	-	0.2226
PCL03	Reclaim Tunnel Scrubber (200-DC-001)	523862.1	3522669.4	1550.8	18.67	100.00	0.001	1.81	0.3600	-	-	-	0.0545
PCL04	Pebble Crusher Area Scrubber	523898.7	3522876.4	1544.7	18.61	100.00	0.001	1.77	0.3200	-	-	-	0.0591
PCL05	Copper Concentrate Scrubber 1	524033.0	3522992.6	1533.8	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL06	Copper Concentrate Scrubber 2	524043.8	3522990.6	1530.1	24.08	100.00	29.491	4.07	1.7800	-	-	-	0.2695
PCL07	Moly Scrubber/Electrostatic Precipitator	524114.0	3522935.8	1524.6	55.00	500.00	10.620	1.00	0.0140	-	-	-	0.0132
PCL08	Moly Dust Collector (510-DC-001)	524034.0	3522999.3	1534.2	6.27	100.00	0.001	0.90	0.0530	-	-	-	0.0080
PCL09	Dust Collector, model DFO-4-16, Donaldson	523991.4	3522567.9	1549.3	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL10	Dust Collector, model DFO-4-16, Donaldson	524009.6	3522566.4	1547.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL11	Dust Collector, model DFO-4-16, Donaldson	524029.4	3522565.1	1543.0	20.00	109.99	76.129	1.67	0.3553	-	-	-	0.1746
PCL12	SAG Feed Conveyor Dust Collector (200-DC-001)	523900.7	3522872.5	1543.5	18.71	100.00	0.001	1.90	0.4600	-	-	-	0.0697
FB01	Diesel Electrowinning Hot water Generator	524241.0	3522386.3	1524.9	12.00	1000.00	130.200	0.30	0.1007	0.2190	0.8759	0.0093	0.0674
Total									**8.0436**	**0.2190**	**0.8759**	**0.0093**	**1.6757**

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
BLST1	Blasting	522517.6	3521978.6	1526.5	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST2	Blasting	522753.4	3521978.6	1526.5	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST3	Blasting	522510.1	3521788.4	1526.5	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST5	Blasting	522510.1	3521575.4	1526.5	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST4	Blasting	522751.3	3521784.1	1526.5	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
BLST6	Blasting	522751.3	3521576.3	1526.5	10.00	14.19	9.30	28.44887	-	147.33333	17.33333	1.64128
UNSUL1	Unload to Sulfide Stockpile #1	523945.9	3521709.9	1531.4	6.50	4.00	6.05	0.05891	-	0.49554	0.00062	0.02164
UNSUL2	Unload to Sulfide Stockpile #2	523878.1	3521730.1	1533.1	6.50	4.00	6.05	0.05891	-	0.49554	0.00062	0.02164
UNSUL3	Unload to Sulfide Stockpile #3	523906.1	3521805.9	1545.0	6.50	4.00	6.05	0.05891	-	0.49554	0.00062	0.02164
UNSUL4	Unload to Sulfide Stockpile #4	523963.4	3521788.6	1549.9	6.50	4.00	6.05	0.05891	-	0.49554	0.00062	0.02164
PC01	Wind Erosion from Sulfide ore Stockpile	523924.1	3521760.1	1539.0	6.00	74.00	5.60	0.62003	-	-	-	0.09300
PC02	Primary Crusher	524077.9	3521773.9	1540.4	0.00	1.91	1.40	0.30737	-	-	-	0.04654
MD04	Moly Concentrate Bin to Hopper	524033.8	3522982.3	1532.8	3.00	0.47	0.70	0.00011	-	-	-	0.00002
TDS04	Fixed Tailings Conveyor 2 to Fixed Tailings Conveyor 3	524603.0	3522350.1	1511.5	3.00	0.47	0.70	0.05657	-	-	-	0.00857
TDS05	Fixed Tailings Conveyor 3 to Relocatable Conveyor	524801.3	3522465.1	1523.9	3.00	0.47	0.70	0.05657	-	-	-	0.00857
TDS06	Relocatable Conveyor to Shiftable Conveyor	524824.4	3522475.9	1522.2	3.00	0.47	0.70	0.05657	-	-	-	0.00857
TDS07	Shiftable Conveyor to Belt Wagon Conveyor	524903.9	3522511.6	1507.3	3.00	0.47	0.70	0.43164	-	-	-	0.06536
TDS08	Belt Wagon Conveyor to Spreader Crwaler Mounted Conveyor	524973.1	3522545.4	1492.7	3.00	0.47	0.70	0.43164	-	-	-	0.06536
TDS09	Spreader Crawler Mounted Conveyor to Tailings Storage	525053.9	3522581.1	1483.6	3.00	0.47	0.70	0.43164	-	-	-	0.06536
TDS10	Wind Erosion from Tailings Storage	525098.2	3522631.3	1476.5	6.00	573.00	5.60	3.45085	-	-	-	0.51763
MS01	Transfer of Bulk Pebble Lime to the Bulk Pebble Lime Silo	523891.5	3522885.84	1546.6	3.00	0.47	0.70	0.18674	-	-	-	0.02828
MS04	Pneumatic Lime Transfer From Truck to Lime Storage Bin (800-BN-801)	524078.69	3522861.62	1523.04	3.00	0.47	0.70	0.51781	-	-	-	0.51781
MS0506	Transfer of Flocculant from Supersacks to Flocculant Storage Bin	524123.4	3522869.4	1523.7	3.00	0.47	0.70	0.00063	-	-	-	0.00009

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
MS0708	Transfer of Guar from Bags to Guar Feeder (F-Gu) and Transfer of Granular Cobalt Sulfate from Bags to Cobalt	524198.0	3522368.1	1522.6	3.00	0.47	0.70	0.00007	-	-	-	0.00001
HAUL1	Haul Roads	522470.4	3521193.0	1677.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL2	Haul Roads	522484.4	3521156.3	1673.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL3	Haul Roads	522498.6	3521120.5	1685.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL4	Haul Roads	522512.4	3521084.3	1678.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL5	Haul Roads	522525.9	3521047.5	1671.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL6	Haul Roads	522540.4	3521011.3	1668.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL7	Haul Roads	522554.1	3520974.8	1669.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL8	Haul Roads	522567.9	3520938.3	1665.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL9	Haul Roads	522582.1	3520902.5	1656.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL10	Haul Roads	522595.6	3520866.0	1650.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL11	Haul Roads	522610.1	3520829.0	1651.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL12	Haul Roads	522634.4	3520799.3	1670.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL13	Haul Roads	522668.9	3520782.8	1674.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL14	Haul Roads	522706.1	3520770.3	1667.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL15	Haul Roads	522743.1	3520757.3	1657.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL16	Haul Roads	522780.4	3520744.5	1641.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL17	Haul Roads	522811.6	3520720.0	1632.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL18	Haul Roads	522842.9	3520695.8	1628.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL19	Haul Roads	522873.4	3520670.5	1621.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL20	Haul Roads	522905.1	3520649.3	1613.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL21	Haul Roads	522942.4	3520640.5	1606.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL22	Haul Roads	522980.6	3520634.0	1599.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL23	Haul Roads	523019.9	3520627.3	1609.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL24	Haul Roads	523058.1	3520621.3	1616.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL25	Haul Roads	523095.4	3520629.3	1610.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL26	Haul Roads	523131.9	3520643.0	1622.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL27	Haul Roads	523168.4	3520656.8	1616.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL28	Haul Roads	523205.4	3520670.3	1606.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL29	Haul Roads	523241.4	3520684.0	1596.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL30	Haul Roads	523277.9	3520697.8	1598.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL31	Haul Roads	523314.1	3520711.3	1601.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL32	Haul Roads	523350.9	3520724.8	1599.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL33	Haul Roads	523387.4	3520738.5	1591.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL34	Haul Roads	523424.4	3520752.3	1586.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL35	Haul Roads	523457.9	3520772.3	1583.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL36	Haul Roads	523492.1	3520790.8	1575.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL37	Haul Roads	523525.9	3520809.0	1571.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL38	Haul Roads	523560.6	3520827.8	1564.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL39	Haul Roads	523594.9	3520847.0	1570.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL40	Haul Roads	523628.4	3520868.3	1572.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL41	Haul Roads	523662.4	3520888.5	1574.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL42	Haul Roads	523696.6	3520907.8	1577.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL43	Haul Roads	523730.4	3520926.5	1573.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL44	Haul Roads	523765.1	3520945.0	1567.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL45	Haul Roads	523798.6	3520964.3	1563.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL46	Haul Roads	523833.1	3520983.0	1551.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL47	Haul Roads	523866.6	3521002.3	1549.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL48	Haul Roads	523901.1	3521021.3	1550.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL49	Haul Roads	523920.1	3520986.0	1550.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL50	Haul Roads	523931.4	3520947.5	1550.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL51	Haul Roads	523941.9	3520910.8	1561.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL52	Haul Roads	523952.6	3520873.0	1563.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL53	Haul Roads	523963.1	3520834.8	1562.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL54	Haul Roads	523973.4	3520797.5	1562.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL55	Haul Roads	523983.9	3520760.5	1571.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL56	Haul Roads	523995.4	3520722.3	1575.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL57	Haul Roads	524006.4	3520684.0	1570.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL58	Haul Roads	524023.9	3520649.3	1567.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL59	Haul Roads	524042.1	3520613.5	1564.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL60	Haul Roads	524061.1	3520580.3	1553.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL61	Haul Roads	524079.4	3520545.3	1553.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL62	Haul Roads	524098.9	3520511.3	1563.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL63	Haul Roads	524116.6	3520475.3	1565.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL64	Haul Roads	524134.1	3520441.0	1570.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL65	Haul Roads	524149.4	3520404.3	1561.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL66	Haul Roads	524164.9	3520368.5	1552.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL67	Haul Roads	524182.4	3520335.0	1544.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL68	Haul Roads	524199.6	3520300.0	1549.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL69	Haul Roads	523908.1	3521059.5	1549.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL70	Haul Roads	523915.4	3521097.5	1550.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL71	Haul Roads	523926.4	3521135.8	1553.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL72	Haul Roads	523940.4	3521171.5	1545.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL73	Haul Roads	523952.9	3521209.3	1539.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL74	Haul Roads	523965.9	3521245.8	1538.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL75	Haul Roads	523977.9	3521282.5	1536.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL76	Haul Roads	523991.6	3521319.0	1535.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL77	Haul Roads	524004.1	3521355.5	1542.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL78	Haul Roads	524037.1	3521331.8	1538.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL79	Haul Roads	524062.9	3521304.0	1534.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL80	Haul Roads	524087.4	3521275.5	1534.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL81	Haul Roads	524113.9	3521245.5	1543.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL82	Haul Roads	524142.4	3521218.8	1545.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL83	Haul Roads	524010.1	3521393.3	1550.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL84	Haul Roads	524017.4	3521431.8	1547.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL85	Haul Roads	524023.9	3521470.8	1546.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL86	Haul Roads	524030.6	3521509.5	1550.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL87	Haul Roads	524036.9	3521547.0	1544.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL88	Haul Roads	524048.1	3521583.8	1522.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL89	Haul Roads	524060.4	3521621.5	1519.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL90	Haul Roads	524072.1	3521659.5	1521.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL91	Haul Roads	524083.9	3521697.0	1525.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL92	Haul Roads	524095.9	3521733.3	1535.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL93	Haul Roads	524131.6	3521699.0	1524.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL94	Haul Roads	524168.1	3521714.5	1520.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL95	Haul Roads	524202.4	3521732.3	1521.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL96	Haul Roads	524236.4	3521753.3	1516.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL97	Haul Roads	524258.4	3521785.5	1511.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL98	Haul Roads	524279.4	3521819.8	1508.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL99	Haul Roads	524298.9	3521853.3	1511.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL100	Haul Roads	524318.6	3521888.8	1511.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL101	Haul Roads	522485.1	3521197.5	1673.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL102	Haul Roads	522499.4	3521161.8	1668.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL103	Haul Roads	522514.4	3521125.5	1678.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL104	Haul Roads	522528.9	3521090.5	1674.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL105	Haul Roads	522542.6	3521052.5	1664.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL106	Haul Roads	522556.4	3521016.5	1662.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL107	Haul Roads	522570.6	3520979.3	1664.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL108	Haul Roads	522585.1	3520944.3	1661.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL109	Haul Roads	522598.1	3520908.0	1654.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL110	Haul Roads	522613.1	3520872.0	1645.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL111	Haul Roads	522626.4	3520834.3	1648.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL112	Haul Roads	522639.6	3520810.8	1665.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL113	Haul Roads	522676.1	3520797.8	1667.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL114	Haul Roads	522713.4	3520785.5	1661.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL115	Haul Roads	522749.9	3520773.5	1652.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL116	Haul Roads	522786.6	3520760.5	1639.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL117	Haul Roads	522819.9	3520734.8	1625.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL118	Haul Roads	522850.9	3520710.3	1625.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL119	Haul Roads	522881.4	3520686.5	1620.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL120	Haul Roads	522911.9	3520662.3	1613.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL121	Haul Roads	522944.6	3520654.0	1606.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL122	Haul Roads	522982.6	3520647.3	1598.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL123	Haul Roads	523021.1	3520641.0	1600.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL124	Haul Roads	523059.9	3520634.3	1614.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL125	Haul Roads	523088.6	3520643.8	1608.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL126	Haul Roads	523125.9	3520656.8	1618.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL127	Haul Roads	523162.1	3520672.0	1615.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL128	Haul Roads	523197.9	3520684.8	1606.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL129	Haul Roads	523234.9	3520698.5	1596.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL130	Haul Roads	523270.9	3520712.8	1591.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL131	Haul Roads	523308.9	3520725.8	1597.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL132	Haul Roads	523345.4	3520739.0	1599.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL133	Haul Roads	523382.4	3520753.3	1594.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL134	Haul Roads	523418.1	3520766.8	1588.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL135	Haul Roads	523452.4	3520786.5	1582.6	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL136	Haul Roads	523486.6	3520805.8	1573.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL137	Haul Roads	523520.1	3520824.5	1569.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL138	Haul Roads	523554.6	3520843.0	1567.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL139	Haul Roads	523585.1	3520865.8	1576.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL140	Haul Roads	523617.6	3520889.3	1578.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL141	Haul Roads	523649.1	3520910.8	1577.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL142	Haul Roads	523681.6	3520932.3	1575.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL143	Haul Roads	523714.1	3520954.8	1570.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL144	Haul Roads	523745.6	3520977.5	1565.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL145	Haul Roads	523779.1	3520998.8	1559.5	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL146	Haul Roads	523811.9	3521018.3	1555.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL147	Haul Roads	523845.4	3521038.8	1549.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL148	Haul Roads	523879.4	3521059.5	1548.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL149	Haul Roads	523942.9	3520992.8	1554.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL150	Haul Roads	523953.6	3520954.8	1559.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL151	Haul Roads	523964.9	3520916.8	1564.3	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL152	Haul Roads	523974.9	3520878.8	1565.9	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL153	Haul Roads	523986.1	3520841.5	1567.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL154	Haul Roads	523996.9	3520803.5	1568.4	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL155	Haul Roads	524007.4	3520767.0	1574.2	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL156	Haul Roads	524018.4	3520729.0	1573.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL157	Haul Roads	524028.6	3520691.3	1561.1	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
HAUL158	Haul Roads	524046.4	3520657.8	1563.0	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL159	Haul Roads	524065.1	3520623.8	1559.7	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
HAUL160	Haul Roads	524083.6	3520587.8	1552.8	6.50	16.28	6.05	0.43904	-	0.49554	0.00062	0.05740
PAV1	Paved Facility Roads	524089.4	3522132.2	1517.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV2	Paved Facility Roads	524061.6	3522148.0	1525.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV3	Paved Facility Roads	524038.6	3522169.1	1525.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV4	Paved Facility Roads	524022.0	3522196.2	1524.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV5	Paved Facility Roads	524011.0	3522226.3	1524.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV6	Paved Facility Roads	524000.1	3522256.4	1525.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV7	Paved Facility Roads	523991.2	3522287.0	1531.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV8	Paved Facility Roads	523986.0	3522318.5	1536.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV9	Paved Facility Roads	523980.7	3522350.1	1541.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV10	Paved Facility Roads	523975.4	3522381.7	1539.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV11	Paved Facility Roads	523970.2	3522413.2	1540.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV12	Paved Facility Roads	523964.9	3522444.8	1547.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV13	Paved Facility Roads	523959.6	3522476.4	1546.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV14	Paved Facility Roads	523954.3	3522507.9	1549.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV15	Paved Facility Roads	523952.1	3522539.7	1551.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV16	Paved Facility Roads	523953.8	3522571.6	1552.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV17	Paved Facility Roads	523955.4	3522603.6	1548.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV18	Paved Facility Roads	523957.0	3522635.5	1540.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV19	Paved Facility Roads	523958.7	3522667.5	1546.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV20	Paved Facility Roads	523960.3	3522699.4	1550.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV21	Paved Facility Roads	523962.0	3522731.4	1553.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV22	Paved Facility Roads	523968.0	3522762.8	1543.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV23	Paved Facility Roads	523974.1	3522794.2	1534.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV24	Paved Facility Roads	523974.9	3522826.2	1531.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV25	Paved Facility Roads	523974.9	3522858.2	1537.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV26	Paved Facility Roads	523969.9	3522889.8	1536.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV27	Paved Facility Roads	523964.8	3522921.4	1537.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV28	Paved Facility Roads	523959.7	3522953.0	1535.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV29	Paved Facility Roads	523948.2	3522982.7	1545.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV30	Paved Facility Roads	523948.5	3523013.3	1551.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV31	Paved Facility Roads	523961.7	3523040.3	1546.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV32	Paved Facility Roads	523989.2	3523056.5	1536.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV33	Paved Facility Roads	524021.2	3523056.5	1532.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV34	Paved Facility Roads	524047.1	3523039.7	1524.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV35	Paved Facility Roads	524071.7	3523019.3	1525.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV36	Paved Facility Roads	524097.4	3523000.1	1522.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV37	Paved Facility Roads	524125.1	3522984.9	1521.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV38	Paved Facility Roads	524155.6	3522975.3	1516.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV39	Paved Facility Roads	524187.2	3522971.5	1514.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV40	Paved Facility Roads	524218.9	3522973.3	1512.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV41	Paved Facility Roads	524250.5	3522978.4	1508.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV42	Paved Facility Roads	524282.3	3522982.1	1505.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV43	Paved Facility Roads	524314.2	3522984.3	1503.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV44	Paved Facility Roads	524346.1	3522986.2	1504.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV45	Paved Facility Roads	524378.1	3522986.2	1506.6	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV46	Paved Facility Roads	524410.1	3522986.3	1508.0	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV47	Paved Facility Roads	524440.9	3522993.0	1517.5	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV48	Paved Facility Roads	524468.8	3523008.7	1526.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV49	Paved Facility Roads	524496.7	3523024.4	1514.6	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV50	Paved Facility Roads	524514.7	3523050.6	1498.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV51	Paved Facility Roads	524532.0	3523077.5	1510.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV52	Paved Facility Roads	524538.9	3523108.8	1520.4	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV53	Paved Facility Roads	524545.8	3523140.0	1527.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV54	Paved Facility Roads	524552.7	3523171.2	1527.0	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV55	Paved Facility Roads	524559.6	3523202.5	1512.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV56	Paved Facility Roads	524564.9	3523234.0	1513.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV57	Paved Facility Roads	524569.8	3523265.7	1522.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV58	Paved Facility Roads	524574.8	3523297.3	1526.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV59	Paved Facility Roads	524579.8	3523328.9	1513.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV60	Paved Facility Roads	524584.8	3523360.5	1507.2	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV61	Paved Facility Roads	524589.7	3523392.1	1502.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV62	Paved Facility Roads	524594.7	3523423.7	1517.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV63	Paved Facility Roads	524608.6	3523450.8	1514.8	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV64	Paved Facility Roads	524631.1	3523473.6	1511.3	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV65	Paved Facility Roads	524653.5	3523496.4	1507.1	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV66	Paved Facility Roads	524676.0	3523519.2	1498.7	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV67	Paved Facility Roads	524698.5	3523542.0	1489.2	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV68	Paved Facility Roads	524720.9	3523564.8	1490.9	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV69	Paved Facility Roads	524743.4	3523587.5	1503.9	5.00	7.44	4.65	0.00379	-	0.04668	0.00051	0.00185
PAV70	Paved Facility Roads	523985.4	3522376.7	1538.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV71	Paved Facility Roads	524016.8	3522370.7	1536.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV72	Paved Facility Roads	524047.2	3522360.7	1533.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV73	Paved Facility Roads	524077.6	3522350.7	1528.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV74	Paved Facility Roads	524108.0	3522340.7	1524.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV75	Paved Facility Roads	524138.4	3522330.7	1523.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV76	Paved Facility Roads	524147.9	3522351.2	1523.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV77	Paved Facility Roads	524149.6	3522383.2	1525.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV78	Paved Facility Roads	524151.4	3522415.1	1530.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV79	Paved Facility Roads	524181.3	3522409.5	1524.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV80	Paved Facility Roads	524211.3	3522398.4	1526.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV81	Paved Facility Roads	524275.7	3522970.0	1505.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV82	Paved Facility Roads	524286.5	3522939.8	1504.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV83	Paved Facility Roads	524297.3	3522909.7	1508.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV84	Paved Facility Roads	524308.1	3522879.6	1511.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV85	Paved Facility Roads	524318.9	3522849.5	1513.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV86	Paved Facility Roads	524329.7	3522819.4	1512.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV87	Paved Facility Roads	524343.1	3522790.4	1509.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV88	Paved Facility Roads	524358.0	3522762.0	1513.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV89	Paved Facility Roads	524370.4	3522732.8	1516.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV90	Paved Facility Roads	524371.4	3522701.2	1512.4	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV91	Paved Facility Roads	524364.8	3522670.2	1521.9	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV92	Paved Facility Roads	524349.5	3522642.4	1532.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV93	Paved Facility Roads	524333.9	3522614.6	1537.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190

Table I.11 Year 5- Modeling Annual Emissions - Volume Sources												
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Horizontal Dimension (m)**	**Vertical Dimension (m)**	**PM_{10} (lb/hr)**	**CO (lb/hr)**	**NO_x (lb/hr)**	**SO_2 (lb/hr)**	**$PM_{2.5}$ (lb/hr)**
PAV94	Paved Facility Roads	524324.6	3522584.0	1526.1	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV95	Paved Facility Roads	524315.2	3522553.4	1520.3	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV96	Paved Facility Roads	524310.4	3522538.0	1519.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV97	Paved Facility Roads	524059.7	3522944.2	1528.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV98	Paved Facility Roads	524039.3	3522919.5	1525.0	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV99	Paved Facility Roads	524052.8	3522904.5	1523.2	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV100	Paved Facility Roads	524084.3	3522909.3	1523.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV101	Paved Facility Roads	524116.3	3522907.9	1517.7	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV102	Paved Facility Roads	524148.3	3522906.5	1512.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV103	Paved Facility Roads	524180.1	3522908.4	1511.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV104	Paved Facility Roads	524210.5	3522917.1	1511.6	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV105	Paved Facility Roads	524229.7	3522941.3	1511.8	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
PAV106	Paved Facility Roads	524232.7	3522964.0	1511.5	5.00	7.44	4.65	0.04476	-	0.04668	0.00051	0.01190
Total								**251.3211**	**-**	**970.2157**	**104.1546**	**21.5236**

Table I.12 Year 5 - Modeling Annual Emissions - Open Pit Source														
Source ID	**Source Description**	**Easting (X) (m)**	**Northing (Y) (m)**	**Base Elevation (m)**	**Release Height (m)**	**Easterly Length (m)**	**Northerly Length (m)**	**Pit Volume (m^3)**	**Angle from North**	**PM10 (lb/hr)**	**CO (lb/hr)**	**NOX (lb/hr)**	**SO2 (lb/hr)**	**PM2P5 (lb/hr)**
PIT	Open Pit Mine	522269.9	3521221.1	1742.4	0	750.00	1050.00	340041000	0	87.18716	-	107.67390	0.14855	13.23906
PIT2	2nd Pit-Berm	523161.4	3520551.6	1645.9	0	1200.00	1400.00	76809601.3	60	32.29080	-	38.15621	0.04738	4.53923
Total										**119.4780**	**-**	**145.8301**	**0.1959**	**17.7783**